Child Deaths in Michigan

Michigan Child Death State Advisory Team Second Annual Report

A report on the causes and trends of child deaths in Michigan based on findings from community-based Child Death Review Teams from 1996 to 1999. With recommendations for policy and practice to prevent child deaths.

Keeping Kids Alive®

The Michigan Family Independence Agency

April, 2001

The Honorable John Engler, Governor
Honorable Members of the Michigan Legislature

I am submitting this second annual report on child deaths in Michigan, in accordance with Public Act 167 of 1997.

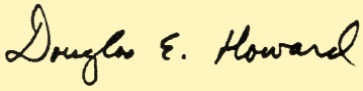
This report highlights the magnitude of and trends in deaths of Michigan children over a ten-year period from 1989-1998. It presents findings from the reviews of deaths conducted by 57 multidisciplinary, community-based child death review teams from around the state from 1996-1999.

A single moment can, in many cases, separate life from death. In the blink of an eye the innocence of childhood is transformed into the anguish of senseless tragedy. The child death review teams in the State of Michigan strive to identify, capture and change the outcome of this critical moment in time.

The report presents recommendations that we believe can improve policy and practice in order to prevent children from dying in Michigan. It represents our continuing efforts to understand and identify what our state can and should do to prevent child deaths. Although there is still much that we do not know, knowledge gained through the review process has led to implementation of prevention efforts throughout Michigan. As we continue our work, we hope to use this report to further the awareness of state and local officials as well as the citizens of Michigan on how we can all help to keep kids alive.

Thank you for supporting Michigan's quest to make each moment of life safer and happier for the children in our communities.

Respectfully Submitted,



Douglas E. Howard
Director
Michigan Family Independence Agency

The Michigan Family Independence Agency provides the funding and oversight for Child Death Review.

This report was compiled by the Michigan Public Health Institute under contract with the Michigan Family Independence Agency.

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EXECUTIVE SUMMARY

Almost 2,000 Michigan children under the age of 19 died in 1999. A single death of a child serves as a powerful warning that other children are at risk. Child Death Review Teams are meeting across the state to review child deaths in order to better understand how and why Michigan's children die and to take action to prevent other deaths.

The findings from these community-based teams are shared with the Michigan Child Death State Advisory Team, in accordance with Public Act 167 of 1997. The State Advisory Team is charged with the responsibility of issuing an annual report to the Governor and Michigan Legislature that will identify and make recommendations on policy and statutory changes pertaining to child fatalities and to guide statewide prevention, education and training efforts.

Over the past year, the Michigan Child Death State Advisory Team has studied the reports and findings from these local reviews, as well as mortality data on child deaths over a ten-year period. This Executive Summary presents key findings from the local review teams and from Michigan child mortality data. It offers recommendations to improve the Child Death Review Process, to improve the systems that respond to child deaths and recommendations that the State Team believes can help prevent other deaths to our children.

The total number of Michigan child deaths, ages 0-18, continued to decline, reaching an all time low in 1998 of 1,952 deaths (a rate of 73.07 death/100,000 children). There were significant improvements in some causes of death from 1997 to 1998. Accidental firearm deaths decreased 59%, suicides dropped by 24%, firearm homicides by 11% and motor vehicle deaths declined by 10%. There was, however, a significant increase in the number of deaths of children from fires, an increase of 32% in one year.

Keeping Kids Alive, the Child Death Review Program, expanded rapidly in Michigan in 1999 as communities embraced the importance of conducting comprehensive reviews. With funding from the Michigan Family Independence Agency and the program support of the Michigan Public Health Institute, there are now 75 local review teams, covering 78 counties. These teams, of more than 1,100 professionals, reviewed 602 child deaths in 1999, bringing the total number of deaths reviewed to 1,429 since the program began as a pilot in 1995.

The reviews are serving as a powerful tool for change to make Michigan safer and healthier for children. In 1999, 259 local prevention initiatives were recommended and 188 were implemented as a result of the review process. Since the program began, 392 separate prevention initiatives have been implemented.

Individuals and agencies responding to situations involving a child's death have also come to learn that working together results in a more coordinated response to a tragic situation. Thus, improvements have been made in fatality investigations and the delivery of services at the local level when a child death occurs.

This report honors the memory of all children who have died in Michigan. The State Advisory Team presents this report in the hope of furthering our understanding of how we can make Michigan a safer and healthier state for children.

The Child Death Review Process

KEY FINDINGS

- Participation in Child Death Review is voluntary, and yet 78 counties (including two multi-county teams) have organized interdisciplinary teams of more than 1,100 professionals that meet regularly to review their child deaths. Five counties did not have review teams in 1999, including Antrim, Dickinson, Iron, Montmorency and Oscoda. (Note: By February 2001, all counties except Montmorency are taking steps to organize a team).
- Membership on the 75 local review teams is broad-based, with over 20 different disciplines represented on teams and leaders from eleven different types of organizations volunteering their time and resources to coordinate the local process.
- Team members throughout the state report that the review process is a powerful community event, increasing not only a community's response to a death but enhancing interagency cooperation that reaches far beyond the review team meetings.
- Teams report widespread willingness to share information on the circumstances surrounding child deaths, but have difficulty accessing key information, especially health and medical information.
- Teams report that some child deaths should have had but did not receive comprehensive death investigations, which includes autopsies, scene investigations and complete reviews of records.
- Teams report that they are able to identify initiatives to prevent other deaths but often lack local funding to implement their plans.

RECOMMENDATIONS

1. Consider a state-level mechanism to assist and support local teams in developing protocols to ensure that they have timely and complete access to all information necessary for an effective review.
2. Support collaborative efforts between the county medical examiners, law enforcement agencies, the Prosecuting Attorneys Association of Michigan and the Michigan Association of Counties to ensure utilization of state standards for child death investigations in all counties.
3. Encourage collaborative efforts between local child death review teams and Human Service Coordinating Bodies to make local prevention funding a priority based on review team findings.
4. Provide training on the child death review process and on child death prevention to other organizations and systems.

Natural Death, Other than SIDS

KEY FINDINGS

- Teams reviewed 203 deaths due to natural causes in 1999 (not including SIDS). There were 1,208 natural child deaths in 1998 (not including SIDS).
- Infants who die in the first 48 hours of life represent the largest group of child deaths in the state.
- Congenital anomalies, low birth weight and prematurity are the leading causes of infant deaths.
- Babies are at the highest risk of death if they are born to poor women with multiple risk factors who do not access prenatal care and other support services.
- African-American children died at a rate 2.5 times higher than white children.
- Fetal Infant Mortality Review (FIMR) is an effective process to review natural deaths and improve systems of care. Nine Michigan counties now have FIMR teams.
- Teams reviewed seven infant abandonment deaths. "The Safe Delivery of Newborn" package of bills was signed into law in Michigan in June. The law took effect on January 1, 2001. It is designed to protect babies from dangerous abandonment.

RECOMMENDATIONS

5. Continue technical and financial support to Fetal Infant Mortality Review Programs (FIMR) in Michigan communities with high infant mortality rates and racial disparities.
6. Encourage support of educational, case management and grief services to families who experience an infant death.
7. Ensure that all women on Medicaid have awareness of the entire array of Medicaid services, including family planning services.
8. Encourage medical care organizations and insurance companies to work with their providers to:
   - Ensure early access to and continuity of care for all pregnant women.
   - Comply with state laws that require physicians to offer pregnant women client-centered counseling and voluntary HIV testing.
   - Improve screening of pregnant women and new parents for domestic violence and substance abuse and assure appropriate referrals to all available services.
   - Increase availability of and referrals to risk reduction programs such as the Medicaid-funded Maternal Support Services (MSS) and Infant Support Services (ISS).
9. Encourage the distribution of family planning information to new parents in prenatal care, at delivery, in pediatrician offices and at other sites utilized by persons of child bearing age.

Sudden Infant Death Syndrome

KEY FINDINGS

- Teams reviewed 63 SIDS deaths in 1999. There were 148 SIDS deaths in 1998.
- Comprehensive scene investigations were lacking in many of the SIDS deaths reviewed, yet scene investigations and autopsies are required by definition in making a SIDS diagnosis.
- Infant sleep position is a key factor in SIDS deaths. The "Back to Sleep" position is known to greatly reduce the risks of SIDS. Yet only eight of the 63 SIDS babies were sleeping in cribs, alone and on their backs. Forty-eight percent of the SIDS babies were sharing a bed with other family members at the time of death.
- Prenatal and second-hand smoke are major risk factors for SIDS. Of the cases reviewed, 44% of the babies were living in smoke-filled environments. Twenty-two mothers reported smoking during pregnancy.
- African American babies remain at a higher risk of SIDS than white babies and are less likely to be put to sleep on their backs.

RECOMMENDATIONS *(See also Suffocation)*

10. Require the use of existing protocols for the investigation of all sudden and unexpected child deaths (including autopsy, scene investigation and review of medical history) modeled after the State of Michigan Protocols to Determine Cause and Manner of Sudden and Unexplained Child Deaths.
11. Study the merits of mandating autopsies for all sudden and unexplained child deaths.
12. Offer and encourage training for medical examiners and law enforcement personnel in the thorough investigation of child deaths.
13. Institute a practice in the Division for Vital Records and Health Statistics (DVRHS) of notifying the appropriate local medical examiner whenever a death certificate is received which shows SIDS as the cause of death, but for which no autopsy was done, and/or the medical examiner had not been involved with the case. DVRHS should encourage a comparable practice with offices of county and city registrars.

14. Build upon the success of the statewide "Back to Sleep" campaign to emphasize safe infant sleeping environments following the recommendations of the Consumer Product Safety Commission, and include a special focus on babysitters and other childcare providers.
15. Incorporate SIDS risk reduction and safe infant sleep materials in Michigan's statewide prenatal smoking cessation programs.
16. Encourage all health care professionals to reinforce the "Back to Sleep" message with parents and caregivers at every opportunity for contact.
17. Provide and reinforce safe infant sleep messages to all parents and caregivers.

Motor Vehicle

KEY FINDINGS

- Teams reviewed 123 motor vehicle deaths in 1999. Motor vehicle crashes killed 238 Michigan children in 1998.
- New drivers, 16-18 years of age, were at fault in one-third of the cases reviewed.
- Many of these deaths were to youths who were passengers in cars being driven by friends who had recently received their license.
- Many of these crashes occurred with more than two passengers in the vehicle or at a late hour.
- Seven deaths occurred when teens ages 14-15 were driving and joy riding in cars.
- Five deaths were reviewed in 1999 of children riding in the back of pick-ups.
- Driver error was involved in almost 40% of the crashes, but it declined as the age of the driver at fault increased.
- Off-road recovery, most often on gravel, was identified as a major contributing factor in many of these deaths.
- Only 25% of the children who died were wearing restraints correctly. Almost 50% of children aged 15-18 had a seat belt present, but did not use it.
- Alcohol was involved in 22% of the deaths, and 60% of the teens ages 16-18 who were driving in the fatal crashes were alcohol-impaired.

RECOMMENDATIONS

18. Ensure the enforcement of new legislation that makes it illegal under certain conditions to ride in the back of a pickup truck.
19. Encourage communities to include information in driver's education courses about the dangers of driving at high speeds on gravel roads or in other poor road conditions, and expand current education on reckless driving.
20. Support steps to enforce and strengthen the current graduated licensing law in Michigan to include:
    - Ensure enforcement of the current requirement that parents document and certify that their children accumulated at least 50 hours of driving experience on Level One Learner's Licenses prior to being awarded Level Two Intermediate Licenses.
    - Amend the current law to include restrictions on the number of young passengers allowed in vehicles driven by teens with Level Two Intermediate Licenses.
21. Encourage auto dealerships to provide point-of-sale information resources about proper installation and usage of child safety seats and booster seats when selling new or used vehicles.

Fire

KEY FINDINGS

- Teams reviewed 51 fire deaths in 1999. There were 52 fire deaths to children in 1998, an increase of 46% from 1996. The number of fire deaths to children in Michigan went up for the second year in a row. One reason is the number of multiple deaths in single house fires. Twenty-seven separate fires killed the 51 children whose deaths were reviewed.
- Young children, ages 1-9, are most vulnerable. Thirty-eight of the 51 deaths were to children in this age group.
- Children playing with matches or other incendiary device caused 40% of the fires reviewed.
- In only three of the 27 house fires were working smoke detectors present.
- Sixty-seven percent of the children who died in fires were poor and living in older, wood-frame houses.
- In 17 fires, teams reported that supervision of young children was inadequate.
- Alcohol or drugs are a significant factor in fires causing multiple deaths. Teams found this to be true in seven fires causing 18 child deaths.
- Teams reviewed two fires causing seven child deaths and two adult deaths in which the foam material in couches may have been a factor in the deaths.

RECOMMENDATIONS

22. Encourage tobacco companies to only produce and market cigarettes that are self-extinguishing.
23. Encourage the Consumer Product Safety Commission to require the furniture manufacturing industry to expand the current fire retardant standards for upholstered furniture beyond commercial aircraft and prisons, to include furniture made for residential use.
24. Encourage local building inspection programs to put high priority on home inspections when children are believed to be at risk of environmental hazards.
25. Encourage public education and local ordinances to increase the use of hardwired or sealed lithium battery smoke detectors and work with manufacturers to discourage the production of smoke detectors with reusable batteries.
26. Expand the number of school districts that participate in the Risk Watch or similar programs, and encourage communities to include the curriculum in preschool programs and in other childcare settings.
27. Support local fire departments in maintaining and expanding further development of “Smokehouse” or similar programs in Michigan.

Drowning

KEY FINDINGS

- Teams reviewed 34 drowning deaths in 1999. Forty children drowned in 1998.
- Over half of the drowning deaths reviewed were to children ages 1-4.
- Three children drowned in bathtubs.
- Thirteen children drowned in swimming pools, but only one of their communities had a local ordinance that requires pool fencing.
- In eight of the 13 pool deaths, a child entered a gate unattended and six of the gates were unlocked.
- Two children drowned while at licensed day care homes, one in a hot tub and one in a pool.
- Sixteen of the 17 children who drowned in open bodies of water were not wearing a Personal Flotation Device.
- Teams believed that only four of these 17 children were adequately supervised.

RECOMMENDATIONS

28. Support public education and awareness campaigns on water safety with a special emphasis on the need for constant adult supervision and a focus on pools and bathtubs.
29. Encourage communities to create local ordinances to enforce the Michigan Building Code regarding pool fencing and pond enclosures in all jurisdictions throughout the state.
30. Encourage schools to seek ways to include swimming lessons and water safety classes for all students through curricula or linkages with other community groups.
31. Encourage local efforts to require signage at designated public swimming areas and waterways indicat-ing possible dangers/hazards such as drop-offs and strong currents in open bodies of water.
32. Review current daycare licensing standards regarding compliance for water hazards in licensed centers/homes.

Suffocation

KEY FINDINGS

- The teams reviewed 16 unintentional suffocations, four homicides and six undetermined suffocations.
- Quality, comprehensive scene investigations are essential to distinguish SIDS from intentional or unintentional suffocations.
- Sixteen of the 26 suffocation deaths reviewed by teams in 1999 were to children less than one year of age.
- Eight of the suffocation deaths were unintentional smothering by an adult who was sleeping with the infant at the time, and alcohol was a factor in two of these deaths.
- Five cases of infant suffocation involved unsafe bedding as a primary factor, most often thick blankets or waterbeds.
- The Consumer Product Safety Commission believes that more than 900 infants suffocate each year due to unsafe sleep environments, including shared sleep surfaces. Yet there is widespread disagreement over the benefits and risks of bed-sharing with infants.
- Teams believed that inability to afford safe bedding was a factor in four deaths.

RECOMMENDATIONS *(THE SAME AS THOSE FOR SIDS. SEE NUMBERS 10-17)*

Other Unintentional Injury

KEY FINDINGS

- Teams reviewed 37 deaths due to other unintentional injuries in 1999. There were 43 child deaths in 1998 due to other unintentional injuries.
- Deaths reviewed included those caused by poisoning, falls, electrocutions, farm machinery, a wolf-dog attack and choking.
- Poisonings are the most common form of other unintentional injury. Accidental ingestion of medication is the most common cause of child poisonings. Alcohol poisoning through binge-drinking is a serious cause of poisoning among adolescents. Twenty-five percent or nine of the deaths reviewed were to poisoning.
- Inadequate supervision was a factor in one quarter of the deaths reviewed.
- Teams found twice as many males as females were victims of other unintentional injury, and nearly half were under the age of one.

RECOMMENDATIONS

33. Encourage education for parents, childcare providers and children on the issues surrounding poison control, especially involving safe storage and dispensing of medications.
34. Encourage compliance through strict enforcement of laws pertaining to excessive alcohol consumption among teens, especially binge drinking.

Firearm

KEY FINDINGS

- Teams reviewed 13 deaths due to firearms in 1999, not including the 15 suicides by firearms. Of the 13, two were unintentional and 11 were homicides. There were three unintentional firearm and 65 homicide firearm deaths to Michigan children in 1998.
- Unintentional firearm deaths to children in Michigan dropped by 68% in one year, to a ten-year low of 3 deaths in 1998. The average number of these deaths for the previous nine years was 13.
- In both of the unintentional firearm deaths, the gun was easily accessible and unlocked. The youth were playing with the guns when they discharged. Michigan passed new laws in 2000 requiring that guns be sold with locking devices.
- Most firearm homicide deaths occur in the City of Detroit, but due to high numbers and time constraints, the Wayne County team did not focus their reviews on this type of death. The team believes most of these deaths are related to drug dealing and/or gangs, and involve high-risk youth with long histories of family, peer and school failures.

RECOMMENDATIONS

35. Ensure enforcement of new legislation that requires licensed gun dealers to provide materials at the point of sale on gun safety and the proper storage of guns in homes with children.
36. Ensure enforcement of new legislation that requires firearms sold in Michigan by licensed dealers be provided with trigger locks or other comparable safety devices.
37. Encourage youth and parent gun safety education.
38. Evaluate current licensing procedures that enable a child to legally use a firearm without attending a gun safety class.
39. Support consequences against adults who furnish guns to minors for non-hunting purposes.
40. Support after-school and evening education and recreation programs for high-risk youth.
41. Support crisis team and victim advocacy to children who witness violence.
42. Encourage Human Service Collaborative Bodies to work with other local level groups to strengthen or enhance innovative, intensive, community based violence prevention initiatives and programs that promote youth successes.
43. Encourage local educational alternatives and social support for students expelled from schools.

Child Abuse and Neglect

KEY FINDINGS

- Teams reviewed 21 child abuse deaths in 1999. Vital statistics reported 14 child abuse homicides in 1998 from information on death certificates. A combined review of three state data sources identified a total of 43 fatal abuse and neglect deaths for the same time period.
- Seventy-seven percent or 16 of the children who died were from poor households.

- Boys were the victims in 71% of the cases reviewed by teams, and most were beaten or shaken to death.
- Eight of the deaths were caused by Shaken Baby Syndrome.
- Fifteen of the 21 homicides were committed by the mothers' boyfriends or children's fathers, most often while the mothers were away.
- Crying was the trigger that led to the beatings in nine of the deaths.
- Six of the 21 children had prior records of abuse and 13 had evidence of prior injuries but no protective service history. Fourteen of the families involved had prior contact with Child Protective Services, but not related to the children who died.
- Medical neglect was suspected in several deaths, in that the parents failed to seek medical care for sick infants.

RECOMMENDATIONS

44. Ensure that the Family Independence Agency's Children's Protective Services worker training emphasizes assessment for medical neglect.
45. Assure that human service professionals working with high-risk families are knowledgeable about support programs and resources for new families, especially Maternal Support Services, Infant Support Services and other state and community-based primary and secondary prevention programs.
46. Educate and support the medical community in identifying child abuse and/or neglect.
47. Expand opportunities to provide intensive and effective home visiting services for high-risk families.
48. Encourage Human Service Collaborative Bodies to examine communication and coordination among public and private agencies, including those across county lines, when serious risk factors are known or identified.

Suicide

KEY FINDINGS

- Teams reviewed 34 suicides in 1999. There were 54 suicides in 1998, down from 70 deaths in 1997.
- Eighty-four percent of the 34 suicide deaths reviewed were boys. Nationally, more girls attempt suicide, but more boys are successful because they tend to use firearms.
- Nine of the victims were ages 10-14, and all nine were boys.
- Of the 34 youth suicides reviewed in 1999, 15 were self-inflicted gunshot wounds, 15 were hangings, three were poisonings and one case involved a train.
- Only six of the firearms used were stored in a locked cabinet. National studies show a strong correlation between accessible guns in the home, suicide attempts and suicide deaths.
- Many cases reviewed identified a precipitating event, including trouble with the law, failing grades and losing friends due to motor vehicle crashes, fires or suicides.

RECOMMENDATIONS:

49. Support statewide efforts to examine all of the issues surrounding adolescent suicide and develop plans for prevention.
50. Institute training for all health, mental health, substance abuse and human service professionals (including teachers) concerning suicide risk assessment and awareness of referral resources.
51. Encourage the development and evaluation of new prevention technologies, especially firearm safety measures, to reduce easy access to lethal means of suicide.
52. Develop model bereavement, grief support and prevention programs for friends and families of suicide victims.

CHILD DEATHS IN MICHIGAN

Michigan Child Death State Advisory Team

SECOND ANNUAL REPORT

MISSION

To understand how and why children die in Michigan,
in order to take action to prevent other child deaths.

SUBMITTED TO

The Honorable John Engler, Governor, State of Michigan
The Honorable Dan L. DeGrow, Majority Leader, Michigan State Senate
The Honorable Rick Johnson, Speaker of the House, Michigan House of Representatives

ACKNOWLEDGEMENTS

We wish to acknowledge the dedication and unwavering support of the more than eleven hundred volunteers from throughout Michigan who serve our state and the children of Michigan by participating on Child Death Review Teams. It is an act of courage to acknowledge that the death of a child is a community problem. Their willingness to step outside of their traditional professional roles and examine all of the circumstances that lead to child deaths, and to seriously consider ways to prevent other deaths, has made this report possible.

Most especially, we want to thank the Child Death Review Team Coordinators, for volunteering their time to organize, facilitate and report on the findings of their reviews.

The Michigan Department of Community Health, Division for Vital Records and Health Statistics has been especially helpful in providing the child mortality data and in helping us to better understand and interpret the statistics on child deaths.

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1999-2000

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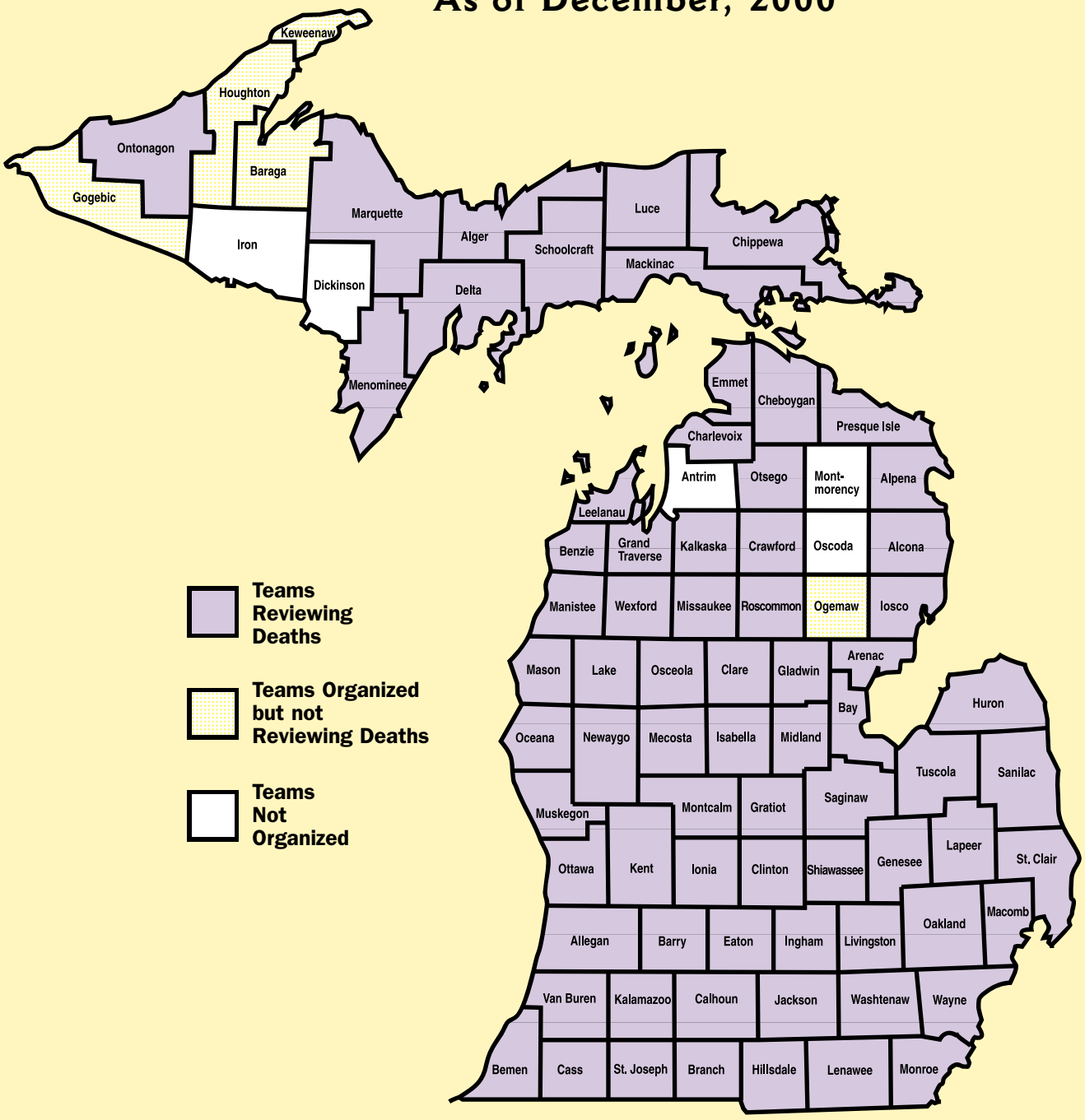
STATUS OF CHILD DEATH REVIEW TEAMS IN MICHIGAN

As of December, 2000



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INTRODUCTION

Local child death review teams try to understand how and why children die, and take action to prevent other deaths.

Child Death Review has grown rapidly in Michigan. From the 17 pilot teams that began in 1995, there are now:

- ***Seventy-five community-based teams, covering 78 counties. There are five other teams under development.***
- ***1,100 community representatives reviewing deaths of children.***

In 1999, these teams reviewed 602 deaths of children, bringing the total number of child deaths reviewed to 1,429 since the program began as a pilot in 1995.

Teams found that 47% of the 602 child deaths they reviewed could have been prevented. Team findings led to the implementation of 188 prevention initiatives.

Local communities throughout the state have embraced the importance of conducting comprehensive reviews of the deaths of their children. They have found that the reviews help them increase their understanding of the nature and scope of child deaths and their responses to the deaths. Through the cooperative, interagency efforts of more than 1,100 professionals volunteering their time and expertise at the reviews, communities are developing an understanding of what action is needed to prevent other deaths. The reviews are serving as a powerful tool for change to make Michigan safer and healthier for children.

In 1999, 259 local prevention initiatives were recommended and 188 were implemented as a result of the review process. Since the program began, 392 separate prevention initiatives have been implemented.

Individuals and agencies responding to situations involving a child's death have also come to learn that working together results in a more coordinated response to a tragic situation. Thus, improvements have been made in the investigations and the delivery of services when a child death occurs.

Over the past year, the Michigan Child Death State Advisory Team has studied mortality data over a ten-year period from 1989 through 1998.

The State Advisory Team found that deaths to children under the age of 18 continued to decline, reaching an all-time state low in 1998 of 1,952 deaths or a rate of 73.07 deaths per 100,000. They found that there have been significant improvements in some areas of child mortality. Accidental firearm deaths decreased 59% from 1997 to 1998; suicides dropped by 24%, firearm homicides by 11% and motor vehicle deaths declined by 10%. There was, however, a significant increase in the number of deaths of children from fires, a rise of 32% in one year.

The State Advisory Team also studied the findings from the local reviews of child deaths in 1999. They learned much about the risk factors involved in child deaths, the ways in which our local communities responded to these deaths and the prevention initiatives resulting from the reviews.

While there is still much to learn, the Child Death State Advisory Team presents this report in honor of the children who have died in our state, in the hope that we will all work to make Michigan a safer and healthier state for children.

This report will:

- ***Present an overview of specific causes of death and the best known practices to prevent deaths.***
- ***Describe deaths of Michigan children which are representative of children who died in our state last year.***
- ***Summarize Michigan mortality data related to the causes of child deaths.***
- ***Summarize the findings of and prevention initiatives developed by local review teams.***
- ***Make recommendations to the Governor and the Michigan Legislature for changes in law, in policy and in practice to prevent child deaths and to improve our system for responding to child deaths.***
- ***Make recommendations to strengthen and improve the Michigan child death review process.***

Public Act 167 of 1997 requires the State Advisory Team to issue an annual report to the Governor and Michigan Legislature that will identify and make recommendations on policy and statutory changes pertaining to child fatalities and guide state-wide prevention, education and training efforts.

PART ONE

CHILD DEATH REVIEW TEAMS

Progress in 1999 and
Recommendations to Strengthen the Process

Conducting a Local Review

PURPOSE

The operating principle of Michigan's Child Death Review is that the death of a child is a community problem and that the circumstances involved in most child deaths are too multidimensional for responsibility to rest in any one place.

The goal of Child Death Review (CDR) is three-fold: to improve our understanding of how and why children die; to demonstrate the need for and to influence policies and programs to improve child health and safety; and to prevent other child deaths.

THE OBJECTIVES OF THE REVIEW ARE THE:

- ***Accurate identification and uniform reporting of the cause and manner of every child death.***
- ***Improved communication and linkages among agencies and enhanced coordination of efforts.***
- ***Improved agency responses to child deaths in the investigation and delivery of services.***
- ***Design and implementation of cooperative, standardized protocols for the investigation of certain categories of child death.***
- ***Identification of needed changes in legislation, policy and practices and expanded efforts in child health and safety to prevent child deaths.***

EXPANSION OF LOCAL TEAMS

Local teams are the foundation for the program and the local experiences drive the state effort. The effort to expand the program to all 83 counties is in its second year. There are now 75 teams covering 78 counties. Several counties are still in the process of organizing their review teams and have yet to conduct a review. Five counties have not yet organized a team. They include Antrim, Dickinson, Iron, Montmorency and Oscoda.

"I participate with Child Death Review because a society that does not investigate the reason for the deaths of its children is not worth living in. Deaths in society mirror the way that society lives."

Dr. Carl Schmidt
Medical Examiner
Wayne County

MEMBERSHIP

There is no state mandate to form local teams, yet there are now more than 1,100 community representatives volunteering their time on the 78 review teams throughout the state.

Local review team members volunteer their time and have demonstrated a tremendous commitment to the review process. Statute requires that where teams are established, they include at least the county medical examiner, the prosecuting attorney, a law enforcement officer and representatives from local public health departments and the Family Independence Agency (FIA).

All of the teams meet this requirement, and most teams have much broader representation including persons from community mental health, education, emergency medical services (EMS), pediatricians and hospitals. The average team size is 20 members. Team members represent the following agencies:

Law Enforcement	291	Courts	24
Local Public Health	130	Social Work	9
FIA	118	Community-based Pediatrician	8
Hospitals	114	Daycare Licensing	6
Medical Examiners	96	Human Service Coordinating Body	6
Prosecuting Attorneys	92	Clergy	5
Community Mental Health	57	Funeral Home	5
Emergency Medical Services	45	Tribal Health and Social Services	4
Education	29	Fire Department	2
Health Clinics and Physicians	36	Other Community Groups	32

TEAM COORDINATION

"I coordinate our team because I see how the reviews provide us with the energy to make all of us focus on our responsibility to prevent other deaths and injuries to our kids. A review meeting is a powerful event."

Pat Webster
Health Department
Luce County

Each Child Death Review team determines the agency or individual that will coordinate their team activities. The role of the coordinator includes identifying cases for review, communicating with team members, coordinating and facilitating the meetings and completing case reports.

There are no program funds supporting the local coordinator activities. In some counties, the position is supported by the local Human Services Coordinating Body (HSCB) or the CDR coordinator is the HSCB prevention coordinator. In some cases, the role of coordinator is shared. Most coordinators have continued to serve since their teams were established. Annual meetings are held for coordinators at regional locations throughout the state. At these meetings, the team coordinators share experiences on their review team processes, offer suggestions to the CDR staff for improvements in support and learn about the prevention initiatives resulting from reviews across the state. The coordinators represent many different agencies including:

Local Public Health	29	Community Mental Health	3
FIA	16	Hospitals	2
Medical Examiners	11	Emergency Medical Services	2
Prosecuting Attorneys	9	Social Work	2
Law Enforcement	7	Health Clinics and Physicians	1
Human Services Coordinating Body	3		

CASES SELECTED FOR REVIEW

The teams attempt to review all deaths of children under the age of 19, with the exception of the largest counties in Michigan (Wayne, Oakland, Kent, Muskegon, Macomb and Genesee). Because of their high numbers of child deaths, these counties review a select sample of deaths. Some teams may select cases that fall under the jurisdiction of the medical examiner for more intensive review. This would include sudden and unexpected deaths, unintentional injury deaths, homicides and suicides.

The most difficult type of death for counties to review is natural death, especially to infants. Often the maternal and perinatal health histories are not available and the medical complexities of these cases make it difficult for teams to review and understand the circumstances. Efforts are now underway in nine Michigan counties to conduct more intensive reviews of infant deaths through the Michigan Fetal Infant Mortality Review program described later in this section.

Due to its high number of deaths, Wayne County experiences unique problems in identifying the deaths its team will review. More than 20 deaths present each month to the Medical Examiner's Office and Wayne County averaged 48 total child deaths each month in 1998. The team reviewed 40 deaths in 1999. They have developed a method to triage cases that individual team members believe are most important to review. Their focus in 1999 was on child abuse homicides, suicides and fires. The team has recently restructured and will be organizing subcommittees in the hope that more deaths can be reviewed in the future.

"The CDR team is a great place for our collaborative partners to stay on top of the major needs in the community. The patterns that we see from our reviews help us to better understand and develop an appropriate focus for our work addressing issues in the community."

Bob Adams
FIA
Gladwin County

"We meet quarterly. Even if we only meet to review one or two deaths, our time is very well spent if it leads to a positive outcome."

Larry Stephens
Health Department
Lenawee County

FREQUENCY OF MEETINGS

Teams vary on how often they meet, dependent on the number of deaths they review. Teams attempt to review the deaths of children that occurred since their last meetings. Most mid-sized counties meet bi-monthly or monthly. Rural counties with few deaths may meet only when a death occurs; some smaller counties may meet quarterly, even when there are no deaths to review. The coordinators report that these meetings enable the team to focus on prevention planning efforts and/or to review non-fatal but serious injury events to children. Some teams may meet within 48 hours of the death to aid in the early investigation.

ACCESS TO INFORMATION FOR AN EFFECTIVE REVIEW

"Working to understand a child's death provides an opportunity to examine the systems in which the child died, in the hope of saving another child from the same fate. I'm honored to be allowed to be a part of it."

Bill Schikora
Child Advocate
Kalamazoo County

The Office of the State Registrar has facilitated a process that enables teams to more readily obtain notification of their child deaths, especially those occurring in counties other than the county of residence. Counties that border other states still find it difficult to obtain information from those states in a timely manner.

The enabling legislation of 1997 provides teams the authority to meet and requires that the meetings are confidential, but it does not address access to records. Many teams continue to report difficulty in gaining access to the information necessary for a complete and quality review, especially health and medical information on the child. Much of the information missing from the death review case reports is due to team members' inability to gather and/or share information.

AT THE REVIEW

An effective review begins with all participants sharing relevant information their agency may have regarding the circumstances surrounding the child's death. Team members ask for clarification as needed. The team discusses each death, considering the following questions:

- ***Is the investigation complete?***
- ***Are there services we should be providing?***
- ***Are there other children at imminent or serious risk of harm?***
- ***What were the risk factors involved in the death?***
- ***Are there agency policies and practices that should be changed?***
- ***What action are we going to take to prevent another death?***

State Program Support

The Michigan FIA provides funding to the Michigan Public Health Institute to manage the program. This funding supports the following:

TECHNICAL ASSISTANCE AND CONSULTATION TO LOCAL TEAMS

Staff regularly attend local review team meetings, assist teams in identifying deaths and accessing information and assist in organizing and facilitating effective meetings. Site visit reports are completed after each review meeting and staff provide follow-up materials and support to the teams. Staff provide information on death investigation, services, prevention and in procuring information on specific deaths. CDR staff manage the database and assist counties in utilizing the Child Death Review Reporting System.

TRAINING FOR NEW TEAM MEMBERS AND TRAINING RELATED TO SPECIFIC CAUSES OF DEATHS

The fifth New Team Member Training was held in May 2000. More than 80 team members attended. Currently, more than 40% of team members have attended the two-day annual training event. These trainings have been highly rated and account in large part for the program's success in rapidly implementing teams. All of the trainers are Michigan experts in areas related to child fatalities.

The program collaborated with the Michigan Department of Community Health (MDCH) in conducting a three-day Michigan Childhood Injury Prevention Conference. Over 150 persons participated in this event, with high representation from child death review teams. The conference was designed to train participants to develop effective community-based injury prevention programs.

Child Death Review also co-sponsored the one-day Infant Safe Sleep Symposium. In partnership with MDCH and the Michigan SIDS Alliance, the summit drew attention to the complex issue of safe infant sleep environments and began to address the need to develop consistent messages for families. More than 150 participants attended this summit.

Child Death Review staff presented on CDR and child fatalities at the FIA Advanced Worker Training Programs. These trainings are designed to enhance the skills of child protective service workers in investi-gating deaths and in working with families who have experienced the death of a child.

The Michigan child death review process is a national model because of its focus on the prevention of deaths. CDR staff presented at more than 30 national, state and local conferences, meetings and trainings to educate and increase interest and participation in the review process. Technical assistance was provided to a number of states developing or expanding their child death review programs, including Ohio, Montana, California, Indiana, Florida, Alabama, New York and Washington. Program staff authored child death review curricula for a national training and presented at the national and international SIDS conferences and a national child abuse conference.

"Our Yellow Ribbon Suicide Prevention Task Force started because of the things I learned at a child death review training. I feel sure that lives have been saved since then."

Cassie Root
EMS
Berrien County

"At a review the people you meet and the contacts you make help you in all areas of your work and you begin to help one another and the system grows, and hopefully you move closer to your goals of keeping all kids safe."

Ronald Gwizdala
Police Detective
Saginaw County

THE CASE REVIEW REPORT SYSTEM

Local teams complete a confidential case report on each death reviewed and submit this report to the state Child Death Review office. It is entered into a database and the aggregate findings are presented in this report. When appropriate, and in accordance with state statute, general findings of the local teams are also shared with the public.

A web-based reporting tool was implemented this year, so that teams are able to file their reports to a secure site on the Internet. The teams are also able to download their own county summary reports based on the data they enter from their reviews. Michigan is currently the only state with an internet-based reporting model. This system is linked to the Michigan Medical Examiner Database. When a local medical examiner enters a child death case into their own database, certain information is made available to the team coordinator for transfer to the Child Death Review Case Report.

The case reports are also linked to the MDCH death file for children and to the FIA Child Death File. This allows the CDR program office to ensure that counties have identified and are able to review all deaths.

FACILITATION OF LINKAGES BETWEEN LOCAL PROGRAMS, STATE, FEDERAL AND OTHER RESOURCES

Child Death Review has worked closely with MDCH and the Michigan SIDS Alliance, especially in areas related to injury prevention and safe sleep initiatives as described above.

CDR has worked closely with MDCH and Michigan State University in implementing the FIMR program. This has helped to ensure that all communities with Fetal Infant Mortality Review (FIMR) and Child Death Review work together to enhance efforts and encourage FIMR efforts in communities with high infant mortality rates.

In 1995, Child Death Review, the Michigan State Police, the Michigan Association of Medical Examiners, the Michigan SIDS Alliance and MDCH worked with a number of state and local organizations to develop the *State of Michigan Protocols to Determine Cause and Manner of Sudden and Unexplained Child Deaths.* This protocol has been endorsed and distributed throughout the state. It is now a required standard for death investigations in a growing number of counties. CDR continues to make the protocol available, supports training for investigators and encourages compliance with the protocol.

The program has collaborated with a number of other state initiatives to encourage and support local and state prevention initiatives. Collaborations have occurred with the SAFE KIDS Campaign, the Children's Trust Fund's Shaken Baby Prevention Initiative and the Michigan State Police Office of Highway Safety Planning. CDR reports regularly to the Governor's Task Force on Children's Justice. Staff serve on the steering committee for FIA's Citizen's Review Panels.

Support for Local Prevention Efforts

Child Death Review staff have worked closely with a number of communities in identifying prevention strategies and locating resources for these programs. A staff prevention coordinator works directly with communities who need assistance in designing programs and obtaining resources.

The Childhood Injury Prevention Conference entitled *Keeping Kids Safe: Tools for Communities* was designed to provide local teams and other groups with the knowledge and resources to design effective prevention initiatives.

In 1999, the W.K. Kellogg Foundation funded Child Death Review with seed money to develop a prevention fund. Local child death review teams will be able to apply for funds to jump-start innovative prevention initiatives identified through their reviews.

The W.K. Kellogg Foundation funded a pilot project to jump-start prevention initiatives identified by review teams.

The Child Death State Advisory Team

This report is the product of the second year's work of the Michigan Child Death State Advisory Team. The team met five times during their second year. Meetings are designed to review findings from local teams, provide opportunities for local teams to present their experiences and to prepare this report with recommendations.

Through legislation signed into law in 1999, the State Advisory Team became one of the three federally mandated Citizen's Review Panels for FIA. These panels are required for states that receive federal Child Abuse Prevention and Treatment Act funds. The panel reviews child abuse related fatalities in Michigan and makes recommendations to FIA for improvements in the state's child protection system. A subcommittee of the State Advisory Team met four times in 1999 to plan and begin their reviews of child abuse and neglect-related fatalities. A separate report will be submitted to the Director of FIA from this subcommittee of the State Advisory Team.

Recommendations for State Policy Makers

1. **Consider a state-level mechanism to assist and support local teams in developing protocols to ensure that they have timely and complete access to all information necessary for an effective review.**

2. **Support collaborative efforts between the county medical examiners, law enforcement agencies, the Prosecuting Attorneys Association of Michigan and the Michigan Association of Counties to ensure utilization of state standards for child death investigations in all counties.**

3. **Encourage collaborative efforts between local child death review teams and Human Service Coordinating Bodies to make local prevention funding a priority based on review team findings.**

4. **Provide training on the child death review process and on child death prevention to other organizations and systems.**

PART TWO

OVERVIEW OF THE REVIEW TEAM FINDINGS AND CHILD MORTALITY DATA

A Note on the Data and Findings Presented in this Report

This report presents review team findings from 1999 and state mortality data from 1989-1998.

This report presents two different types of information on child deaths:

1. Child death review team findings of children who died in 1999 or in earlier years, but whose deaths were reviewed in 1999. These findings represent only the deaths selected for review by the teams, but accounted for approximately 30% of all deaths from 1999. This data is presented as tables or in the narrative throughout the report.

2. Mortality data of children who have died in Michigan over a 10-year period, from 1989 through 1998. These numbers are the official count of deaths and represent all deaths of children in Michigan. This data is presented as figures throughout the report.

The reader is cautioned not to make a direct comparison between these two major types of data. It is important to keep in mind the following:

- Child mortality data becomes available to the public approximately ten months after the end of the calendar year. This report contains mortality data only through 1998. Therefore, the mortality data lags one year behind review team findings. While child death review team information from 1999 is included in this report, the mortality data for 1999 is not.
- The child mortality data represents all child deaths from all Michigan counties by residence for the calendar years 1989-1998. Child death review data may include both resident and non-resident deaths.
- Because not all child deaths are reviewed, it should not be assumed that the child death review teams' findings represent the complete picture of child deaths in Michigan.

Death rates are not provided if the number of cases in a specific category is less than six.

The data presented in this report come from the following sources:

1. Child Death Review Report Data: The source of this data is the Child Death Review Case Report Database, managed by the Michigan Public Health Institute. This data is the property of the Michigan FIA. It is tabulated from the case reports completed by local teams once they review a death. This report presents local data for calendar year 1999 unless otherwise noted. The case report is an interpretation from each review team on a number of areas related to the child's death with a special emphasis on the risk factors involved, the investigation, delivery of services and prevention initiatives developed through the review.

2. Child Mortality Data: The source of all the mortality data is the 1989-1998 Michigan Resident Death File, Division for Vital Records and Health Statistics, Office of the State Registrar, MDCH. This data is tabulated from death certificates, as filed by each county clerk to the State Registrar. Death certificates enumerate the causes and manners of death by age, race, sex and other factors.

3. Michigan FIA Child Death Data: The source for this data is the Child Death Database, Office of Child and Family Services, FIA. These reports represent deaths from October 1, 1998 to September 30, 1999. This data, presented only in the section on child abuse and neglect deaths, comes from reports submitted by county FIA staff.

   A report is submitted when FIA staff:

   - Become aware that a child in the child welfare system has died.
   - Investigate a death potentially due to abuse or neglect.
   - Believe that filing a report may benefit subsequent children in a family.

4. Population Data: The source of this data is the Office of the State Demographer, Michigan Department of Management and Budget. This is the official count of Michigan's resident population of children ages 0-18. The data are used to calculate death rates. Death rates are calculated as the number of resident deaths in a specific age group divided by the total number of residents in a specific age group times 100,000. The resident populations are based on population estimates for a specific year. Appendix H lists the population data used in determining rates in this report. Death rates for infants under one year of age are calculated using a different formula: the number of deaths divided by the number of live births times 1,000.

MICHIGAN CHILD DEATH REVIEW: A SUMMARY OF 1999 FINDINGS

In 1999, 602 child deaths received comprehensive reviews in Michigan. Based on 1998 mortality data, the reviews represent approximately 30% of all child deaths in the state, 40% of all deaths outside of Wayne County and seven percent of Wayne County deaths. This is a 20% increase in reviews from 1998. Case review reports were available from 57 local child death review teams in Michigan for 1999, an increase of 33% over 1998. The total number of deaths reviewed by teams since the inception of the program in 1995 totals 1,429 child deaths.

Approximately 30% of all child deaths in Michigan were reviewed in 1999 by local teams.

Table 1
Deaths Reviewed by Age in 1999

Age	Number of Cases
0-27 days	111
28-364 days	129
1-4 years	95
5-9 years	63
10-14 years	58
15-18 years	131
19 years	4
Missing	11
Total	602

Table 2
Deaths Reviewed in 1999 and
Child Deaths in Michigan by Manner in 1998
An Approximate Comparison

Manner of Death	Number of Cases Reviewed, 1999	Number of Child Deaths Ages 0-18, 1998
Natural	257	1,356
Accidental	230	405
Homicide	40	125
Suicide	34	54
Undetermined/Pending	36	12
Missing Data	5	-
Total	602	1,952

Table 3
Deaths Reviewed by Cause

Cause of Death	Number of Cases Reviewed, 1999	Percent of Total Reviews 1999
Natural Deaths<one year old*	135	22.4
Natural Deaths>one year old	68	11.3
SIDS	63	10.5
Motor Vehicle	123	20.4
Fire	51	8.5
Drowning	34	5.6
Suffocation/Strangulation	42	7.0
Firearm/Weapon	28	4.7
Child Abuse/Neglect	21	3.5
Poisoning	9	1.5
Electrocution	2	0.3
Fall	1	0.2
Any Other Cause	25	4.1
Total	602	100.0

*excluding SIDS

TAKING ACTION TO PREVENT OTHER DEATHS

Teams report that 47% of the deaths they reviewed could have been prevented.

A child's death is considered preventable if an individual or the community could have reasonably done something that would have changed the outcome. At each review, the team makes a determination of preventability. Teams determine this within the context of their own communities. Of the 602 deaths reviewed, team members believed that 206 (34%) were "definitely" preventable and 81 (13%) of the deaths were "probably" preventable.

RISK FACTORS

During the review, team members are asked to identify what underlying risk factors may have influenced or contributed to the death. They determine what risk factors should be or can be changed, minimized or eliminated to prevent other deaths. There may be more than one risk factor involved in a death. For example, in a house fire team members might consider the following risk factors:

RISK FACTORS IN A HOUSE FIRE

Behavioral: *Smoking in bed*
Social: *No local support for housing inspections*
Economic: *Substandard housing*
Environmental: *Old wiring in house*
Product Safety: *Faulty space heater*

The following risk factors were identified by teams as the primary contributors to the preventable deaths they reviewed:

Drugs or alcohol were a factor in 11.1% of all preventable deaths reviewed.

Table 4
Risk Factors Involved in Preventable Deaths Reviewed

Risk Factor	Number of Cases	% of Cases
Behavioral	294	48.8
Medical	172	28.6
Environmental	115	19.1
Social	101	16.8
Drugs or Alcohol	67	11.1
Other	51	8.5
Economic	45	7.5
Product Safety	33	5.5

Communities reviewing children's deaths have been effective in translating their reviews into action to prevent future tragedies. Teams report that 13.5% of their reviews were directly responsible for the implementation of a specific community prevention initiative. Communities also reported that many initiatives were recommended through the review or implemented following the review.

In 1999, CDR teams made 259 prevention recommendations and 188 prevention initiatives were implemented.

Since 1995, review teams recommended 678 prevention initiatives and have implemented 392 of them.

Table 5
Prevention Initiatives Recommended and Resulting from Reviews

Type of Initiative	Recommended	Initiated
Education in the Media	58	47
Education in Schools	43	31
Community Safety Project	32	20
Legislation, Law or Ordinance	22	12
Changes in Agency Practice	15	15
Advocacy	14	11
Public Forums	12	12
Product Safety Action	8	6
New Services	6	8
Other Programs	49	26
Total	259	188

Table 6
Target Populations for Prevention Initiatives

Target Population	Prevention Initiatives
The General Public	141
Parents and Caregivers	113
Children	78
Professionals	58
Others	20

"Our child death review teams break down the barriers between professions, and we all learn from each other. The loss of a child teaches us valuable lessons in prevention, systems response and program development. A child's death should not be in vain."

Amelia Afsari
Health Department
District 10

The teams have demonstrated that responsibility for prevention is a community concern and is not the sole responsibility of one single agency or community group. Many times the teams connect with organizations not participating in the review to translate their findings into action. These organizations may be SAFE KIDS coalitions, civic groups, youth programs or other child advocacy associations.

Table 7
Lead Organizations for Local Prevention Initiatives Resulting from Reviews in 1999

Lead Organization	Number of Initiatives	Percent
Local Health Department	50	27.8
Law Enforcement Agency	36	20.0
Schools	19	10.6
Local Community Group	13	7.2
Local FIA	11	6.1
Community Mental Health	6	3.3
Other	45	25.0

IMPROVEMENTS TO INVESTIGATIONS AND SERVICES

As a result of the review process, communities across the state have made improvements in their systems that investigate child deaths. Many communities now use the *State of Michigan Protocols to Determine Cause and Manner of Sudden and Unexplained Child Deaths,* developed through Child Death Review in 1995. These protocols include standards for autopsies, death scene investigations and reviews of medical histories. Many counties across the state now require the use of these protocols. Several communities have put into place written procedures to be followed in the event of a child's death, effecting the emergency medical response, law enforcement involvement and role of the medical examiner.

The reviews may lead to additional investigations or the reopening of an investigation, as information is shared among members. Fifty-four reviews led to additional investigations being conducted. In nine cases, the review led to the original cause and manner of death being changed.

During the reviews, team members determine if additional services should be provided to family members or others in the community because of the death. These services could include bereavement support, stress debriefing for first responders, economic support for family members or crisis intervention for other children affected by the death. Thirty of the reviews led to the provision of additional services.

"The child death investigation protocol has led to more consistent and efficient investigations and has helped us standardize our investigation process."

Bob Donker
Sheriff's Detective
Ottawa County

IMPROVEMENTS IN COMMUNITY COORDINATION AND COLLABORATION

In coming together to review the deaths of children, many agencies report that they have a better understanding of other agencies' roles and responsibilities in keeping children safe, healthy and protected. Agencies report that the relationships they have developed carry over into other areas of their work. For many, their child death review team meetings create new and valuable opportunities to work together for children. Many team members also report that the review process has expanded their own perspective on the role that they can play in their community in supporting programs to prevent child deaths.

"Although we all knew each other previously, the death review process has brought us together on a regular basis. This has fostered our understanding of each other's roles and our capacities to work more effectively together."

Dr. Dean Sienko
Medical Examiner
Ingham County
Health Department
Barry/Eaton/Ingham Counties

MICHIGAN CHILD MORTALITY: A SUMMARY OF 1989-1998 DATA

1,952 Michigan children died in 1998.

In 1998, 1,952 children died in Michigan. This is the lowest number of child deaths in a 10-year period representing almost a 30% decrease in the rate from 1989 and a two-percent decrease from 1997.

More than half of the children died before the age of one, and most of these infants died within the first 48 hours of life from natural causes, especially congenital anomalies and complications of low birth weight and preterm deliveries. These and other natural conditions were the cause of 95.1% of all *infant* deaths.

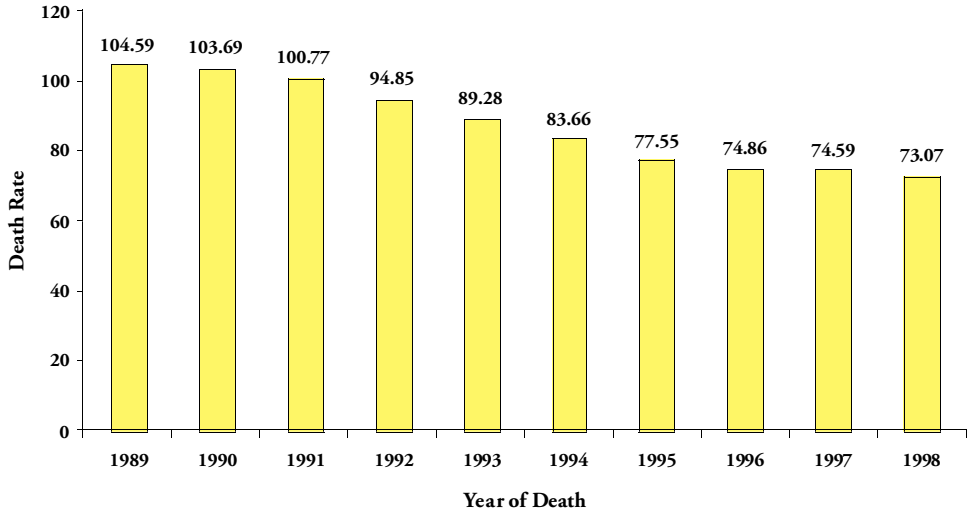
Unintentional injuries (more commonly referred to as accidents) were the leading cause of death for all children over one year of age. Motor vehicle deaths were the number one cause for this age group, accounting for 59%, followed by fires, drownings and suffocations. For adolescents, homicides and suicides followed motor vehicle deaths as the second and third leading causes of death overall.

In almost all causes of death, there were wide discrepancies in race and sex among the children who died. In most causes, African American children died at much higher rates than whites and other races, and boys were more often at risk than girls.

The following figures are compiled from death certificates for children who died in 1998. More detailed information on specific causes of death are described in this section.

Child death rates have declined by almost 30% in the past ten years.

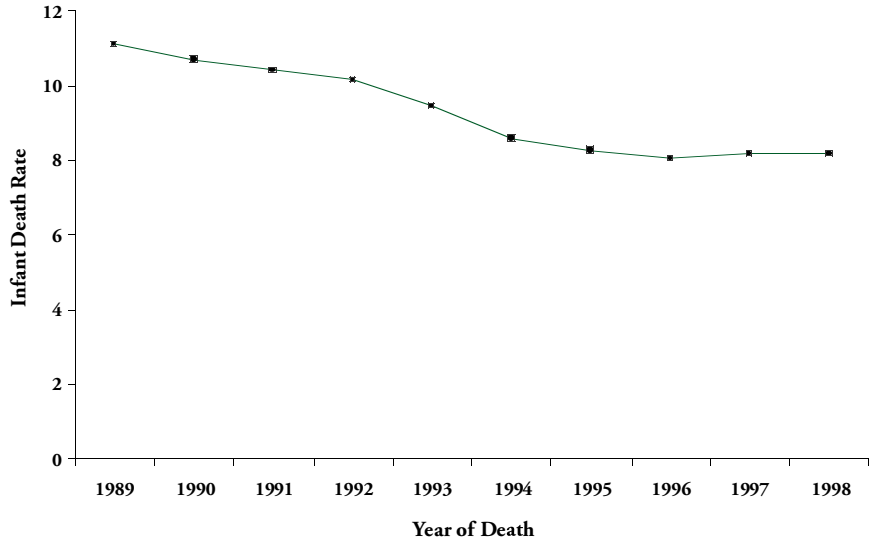
Figure 1. Michigan Child Death Rates*, Ages 0-18, 1989-1998



*per 100,000 of resident population in age group

There were 1,952 deaths in 1998.

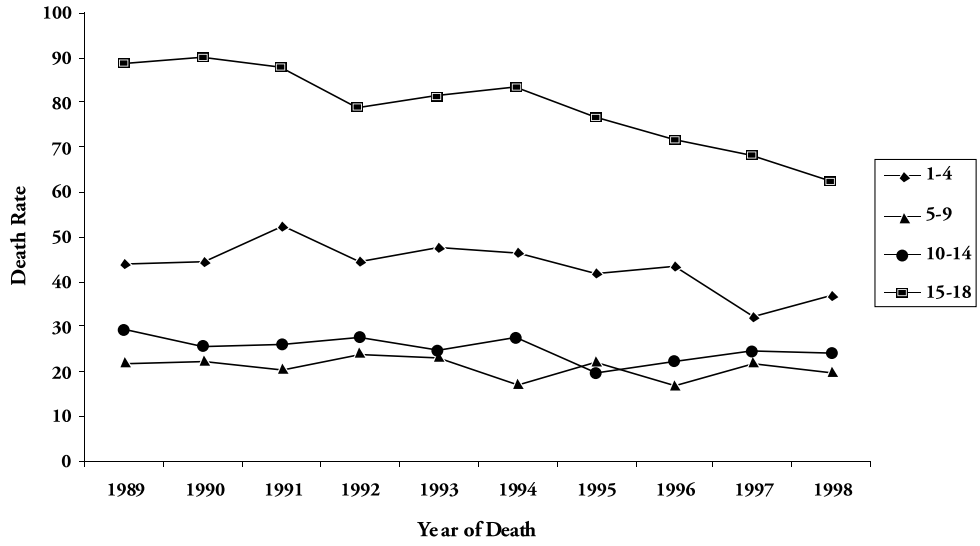
Figure 2. Michigan Infant Death Rates*, Less than One Year of Age, 1989-1998



*per 1,000 live births

Most deaths are to infants, within the first 48 hours of life.

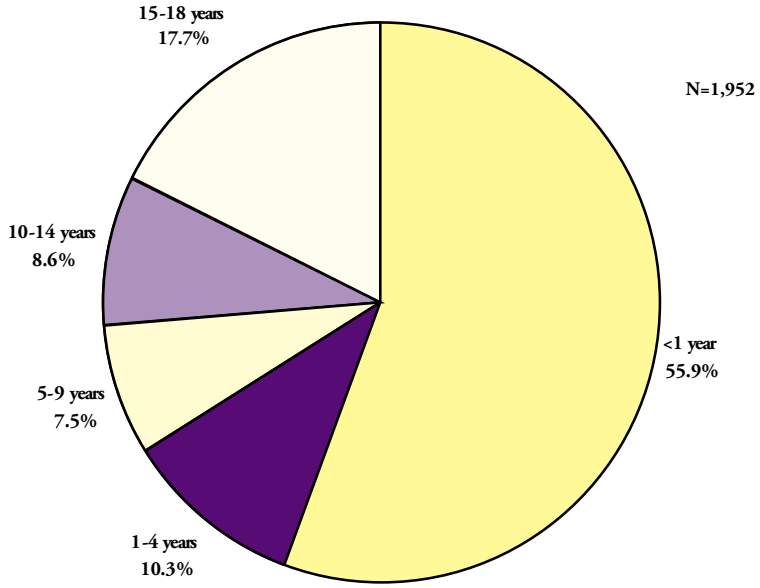
Figure 3. Michigan Child Death Rates*, Ages 1-18, 1989-1998



*per 100,000 of resident population in age group

Adolescent death rates have declined mostly due to a decline in gun-related homicides.

Figure 4. Michigan Child Deaths by Age, 1998



CHILD DEATHS BY CAUSE AND MANNER

Figure 5. Michigan Child Death Rates*, Ages 0-18, 1997-1998

Cause of Death	1997 Rate	1998 Rate
All Deaths	74.59	73.07
Natural (not SIDS)	46.77	46.06
SIDS	1.03	1.11
Unintentional	15.39	15.16
Motor Vehicle	9.87	8.91
Fire	1.32	1.95
Drowning	1.32	1.50
Suffocation	1.13	1.09
Firearm	0.34	0.11
Homicide	4.27	4.68
Firearm	2.72	2.43
Child Abuse	0.42	0.52
Suicide	2.65	2.02

*per 100,000 of resident population in age group

Figure 6. Michigan Child Deaths by Manner, Less than One Year of Age, 1998

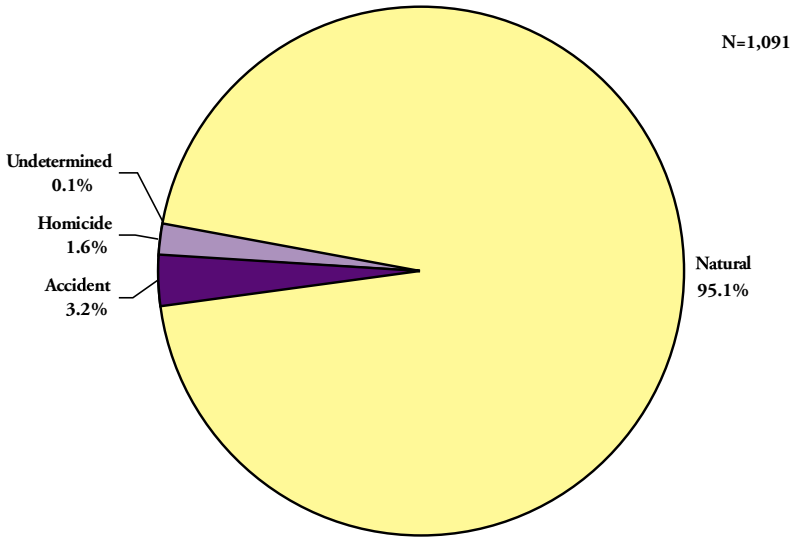
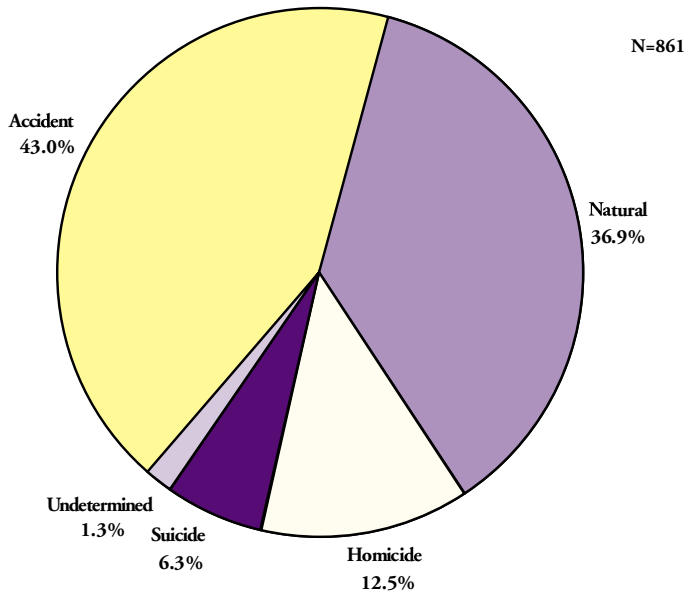


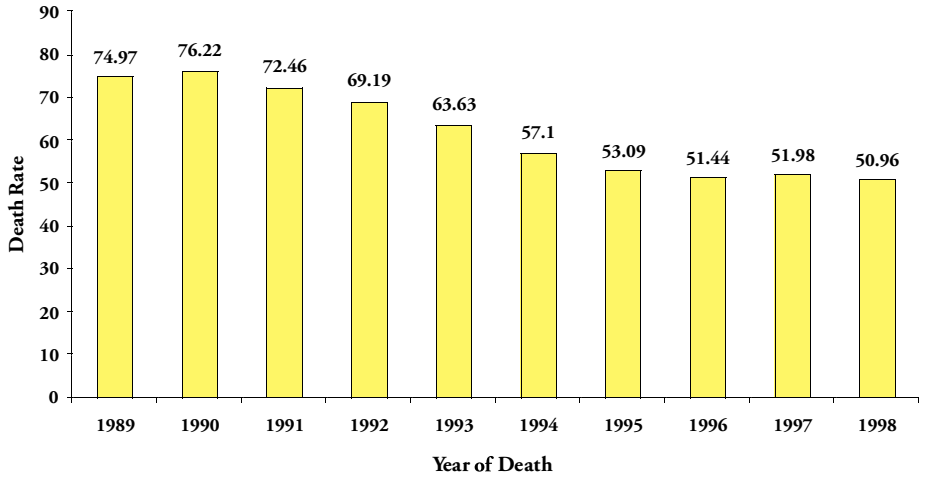
Figure 7. Michigan Child Deaths by Manner, Ages 1-18, 1998



Accidents are the leading cause of death to children between the ages of one and eighteen.

Figure 8. Michigan Natural Child Death Rates*, Ages 0-18, 1989-1998

1,356 children died of natural causes in 1998.

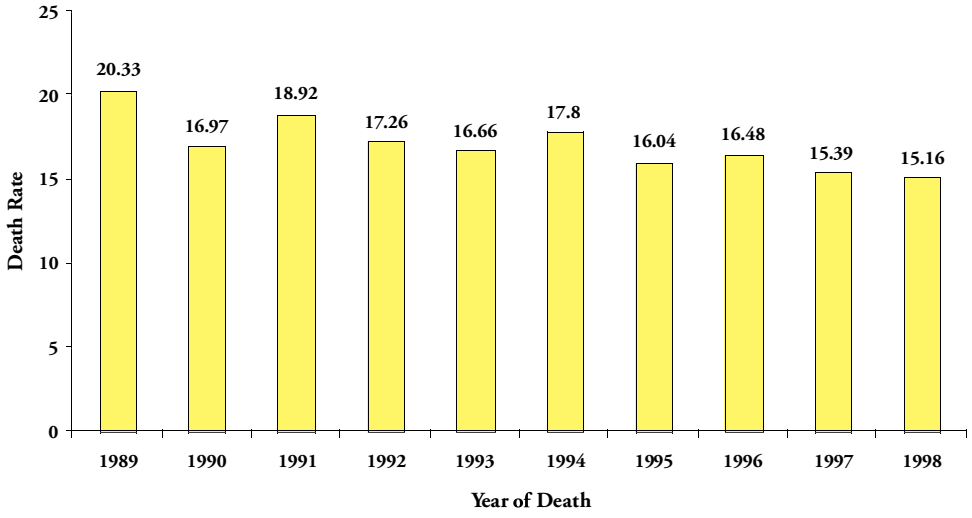


*per 100,000 of resident population in age group

There were 1,356 deaths in 1998.

Figure 9. Michigan Unintentional Child Death Rates*, Ages 0-18, 1989-1998

405 children died due to unintentional injuries (accidents) in 1998.



*per 100,000 of resident population in age group

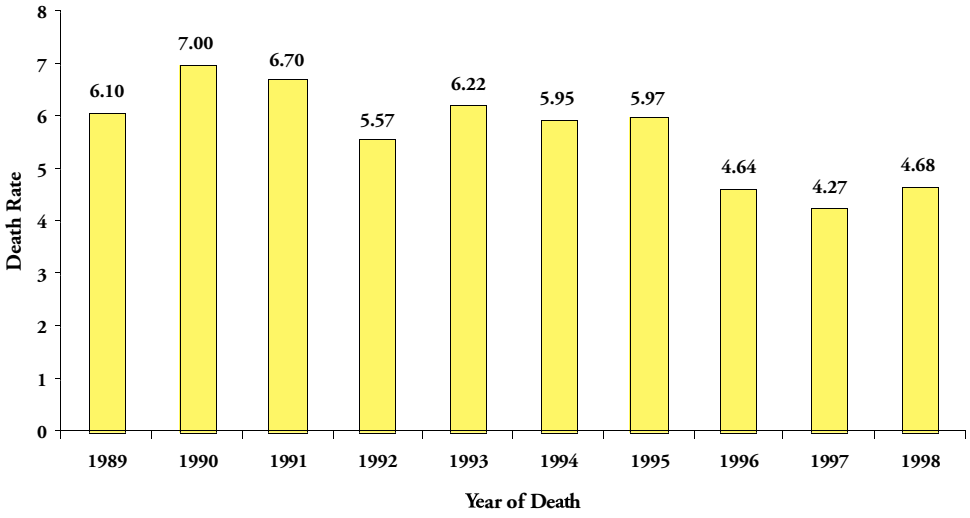
There were 405 deaths in 1998.

Figure 10. Michigan Child Deaths Due to Unintentional Injuries by Cause, Ages 0-18, 1998

Cause of Death	Number of Deaths
Motor Vehicle Crashes	238
Fires	52
Drownings	40
Suffocations	29
Others	17
Poisonings	9
Falls	3
Firearms	3
Electrocutions	2
Ag. Machines	2
Other	10

N=405
Includes ICD code: E800.0-E849.9

Figure 11. Michigan Child Homicide Rates*, Ages 0-18, 1989-1998



*per 100,000 of resident population in age group
There were 125 deaths in 1998.

125 children were victims of homicide in 1998.

Figure 12. Michigan Child Homicides by Cause, Ages 0-18, 1998

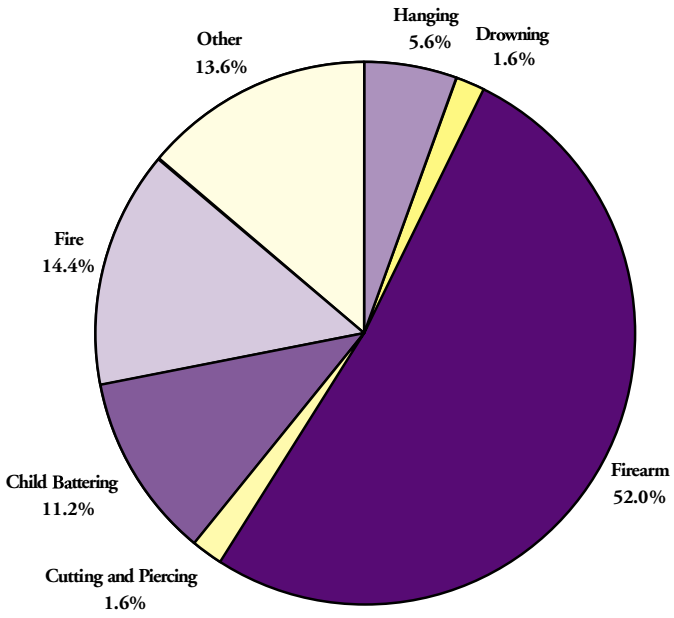
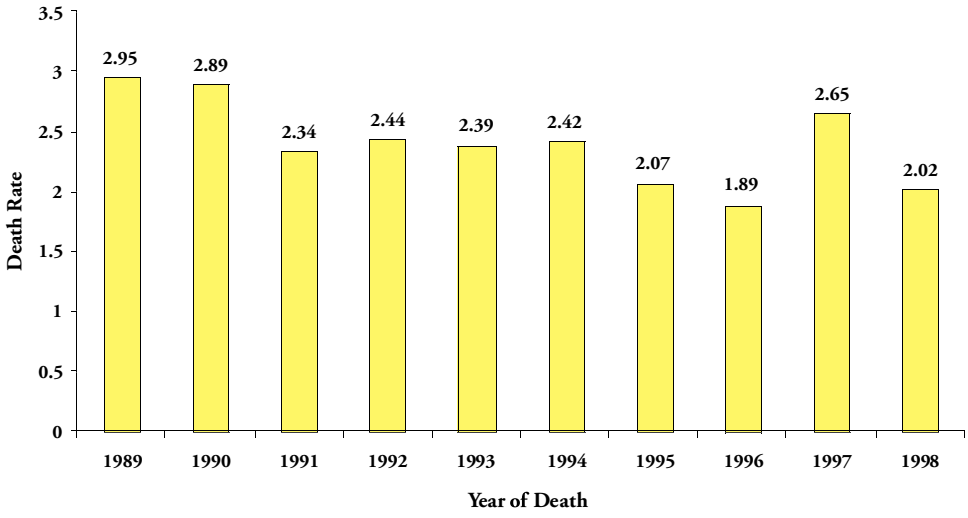


Figure 13. Michigan Child Suicide Rates*, Ages 0-18, 1989-1998

54 Michigan children committed suicide in 1998.



*per 100,000 of resident population in age group

There were 54 deaths in 1998.

PART THREE

MAJOR CAUSES OF CHILD DEATH

By: Natural Deaths Other than SIDS
Sudden Infant Death Syndrome
Motor Vehicle
Fire
Drowning
Suffocation
Other Unintentional Injury
Firearm
Child Abuse and Neglect
Suicide

NATURAL DEATHS, OTHER THAN SIDS

Infants who die in the first 48 hours of life represent the largest group of child deaths in the state.

Congenital anomalies, low birth weight and prematurity are the leading causes of infant deaths.

OVERVIEW

Natural death is the leading cause of death in children because half of all deaths happen in infancy and 95% of infant deaths are natural. For children ages 1-18, natural death was the cause in 36.9% of deaths in 1998. Older children die of natural causes most often from complications of congenital anomolies, cancer, heart and respiration problems and infection.

The 1998 Michigan Health Statistics reports that for every 1,000 infants born in Michigan, approximately eight will die before the age of one. Neonatal deaths refer to babies who die within their first 28 days of life. They represent about two-thirds of infant deaths and the largest single group of deaths in the state.

The remaining third occur as post-neonates from day 28 up to age one. Of the deaths occurring during the neonatal time period, about half happen in the first week of life, often from congenital anomalies or conditions associated with prematurity, low birth weight and respiratory distress.

Nationally, birth outcomes have greatly improved over the past decade. A number of factors have contributed, including: the discovery of new medical treatments, devices and protocols; improved screening for fetal anomalies; regional transport for high risk deliveries and protective maternal and family behaviors like breastfeeding, not smoking and placing infants on their backs to sleep in safe environments.

However, some infants continue to be at highest risk. In 1998, Michigan infants born with very low birth weight of less than 1,500 grams (3 pounds, 5 ounces) experienced an infant death rate of 260.2 per 1,000 live births compared to a rate of 3.1 for infants weighing 2,500 grams (5 pounds, 8 ounces) or more at birth. Multiple births had an infant death rate four times that of single births.

There continue to be great disparities in death rates between black and white infants. In 1998, while the overall infant mortality rate was 8.2 in Michigan, the rate for white infants was 6.3, and the rate for black infants was 16.8. The rate was 6.0 for other race infants including Native Americans, Asians and Pacific Islanders.

While most babies die of natural causes, it is widely believed that many of these deaths are preventable. Many of the infants die due to conditions originating in the pregnancy and perinatal period, with poverty being the single greatest risk factor. Inadequate and/or late prenatal care and stresses during the prenatal period greatly increase the risk of a poor birth outcome. These risks are compounded when the pregnancy is unwanted or unintended. The 1997 report of the Michigan Pregnancy Risk Assessment Monitoring System (PRAMS), in a survey of 1,600 women who had a live birth in 1996, found that almost 44% of these pregnancies were unintended. Over 70% of these women were on Medicaid.

Stresses brought on by or made worse by the pregnancy, including chronic anxiety, substance abuse and domestic violence also play a great role in increasing the risk of poor birth outcomes. A study by Michigan State University researchers in Saginaw, Michigan, found that half of all infant deaths they reviewed were to mothers who were current or prior victims of domestic violence.

When families experience the loss of an infant, access to and utilization of bereavement support services can be very effective in helping them deal with the loss and prepare for successful subsequent pregnancies. MDCH, in a partnership with the Michigan SIDS Alliance, funds up to six bereavement visits for families whose child dies suddenly and unexpectedly.

During the past year in Michigan, a number of highly publicized abandoned baby cases brought attention to the number of babies born to mothers, usually teens, who deny and/or hide their pregnancies and births. In the past three years, child death review teams have reviewed seven deaths of infants whose mothers hid their pregnancies and births. They found that in most cases the mothers were young and afraid to tell an adult of the pregnancy. The teens typically managed to hide the pregnancy, did not obtain prenatal care and gave birth in secrecy without seeking help. In a number of cases, the mothers believed their babies were stillborn. Michigan passed four new laws in June, 2000 to address these cases. Under the new laws, parents who do not want their newborn baby can surrender it to a person on duty at a hospital, police or fire station. When parents follow this procedure, they can use it as an affirmative defense against prosecution for child abandonment or exposure. A hotline has been established to provide information that may prevent infant abandonment and help parents find the help that they need (1-866-733-7733). This package of laws puts in place a system that attempts to protect infants from injury or death.

MAJOR RISK FACTORS

Note: Most of these risk factors refer to mothers.

- ***Living in poverty.***
- ***Unmarried status.***
- ***A low education level.***
- ***An unintended or unwanted pregnancy.***
- ***Lack of access to or inadequate prenatal care.***
- ***Smoking during pregnancy.***
- ***Young (under 20) or older (over 40) while pregnant.***
- ***Victim of domestic violence.***
- ***Substance abuse during pregnancy.***
- ***Presence of life stresses such as homelessness, lack of transportation, mental illness and inadequate nutrition.***
- ***On-the-stomach sleep position/crowded sleep environments.***

PREVENTION STRATEGIES THAT WORK

- ***Easy access to and improved utilization of family planning services.***
- ***Improved access to and utilization of prenatal care.***
- ***Early identification of high-risk pregnancies.***
- ***Intensive outreach efforts to provide services, especially to pregnant teens and other high-risk women.***
- ***Prenatal screening and treatment for substance abuse.***
- ***Prenatal screening and shelter for domestic violence.***
- ***Prenatal smoking cessation education and support services.***
- ***Parenting education and infant care training, especially through home visits with high-risk parents.***

"The Safe Delivery of Newborns" package of bills was signed into Michigan law in June of 2000. It is designed to protect unwanted babies from dangerous abandonment.

Five Michigan Children who Died in 1999

- **Twin brothers were delivered at 25 weeks gestation, weighing just over a pound each. The twins were placed in the NICU and both died by the end of the second week. Both babies' deaths were attributed to complications of prematurity and low birth weight. Their 17-year-old mother had one doctor's visit for a positive pregnancy test just two weeks prior to her unexpected delivery at home. Her parents were unaware of the pregnancy. She planned to enter prenatal care after she broke the news of the pregnancy to her boyfriend.**

- **A 32-year-old woman had two previous perinatal losses. She had no living children. She went to one prenatal visit and had four broken appointments, but during her pregnancy, she went to the ER six times for symptoms of pain and spotting. Each time, her boyfriend remained with her and answered questions for her. At 25 weeks, she was brought into the ER in active preterm labor. She had fresh bruises around her throat and two black eyes. She delivered a baby girl weighing less than two pounds. The baby died two days later due to prematurity. The mother was not screened during pregnancy for domestic violence, and was unaware of resources, the domestic violence shelter or strategies for developing a safe exit plan from her abusive boyfriend.**

- **A 14-year-old girl delivered her baby in her bedroom after 20 hours of contractions throughout the day. She lived with her mother who was unaware of her pregnancy. The young girl had not told anyone about the pregnancy because she was afraid of her parents' reaction. The girl's mother was working a late shift when the baby was born. The baby was very small at birth, weighing about three pounds. The girl was unsure what to do after the baby was born. A few minutes after delivery the baby stopped breathing.**

- **A woman in her early 30's delivered a healthy baby boy, following extensive fertility treatments. At 10 days of age, the infant was found unresponsive while sleeping between the mother and back of the sofa. The sofa cushions were very soft and covered with three layers of blankets and a pillow. The mother was bottle-feeding the infant and fell asleep for a short time with her baby. The death was ruled natural, due to undeterminable cause.**

Figure 14. Michigan Natural Child Deaths Other than SIDS, Ages 0-18, 1989-1998

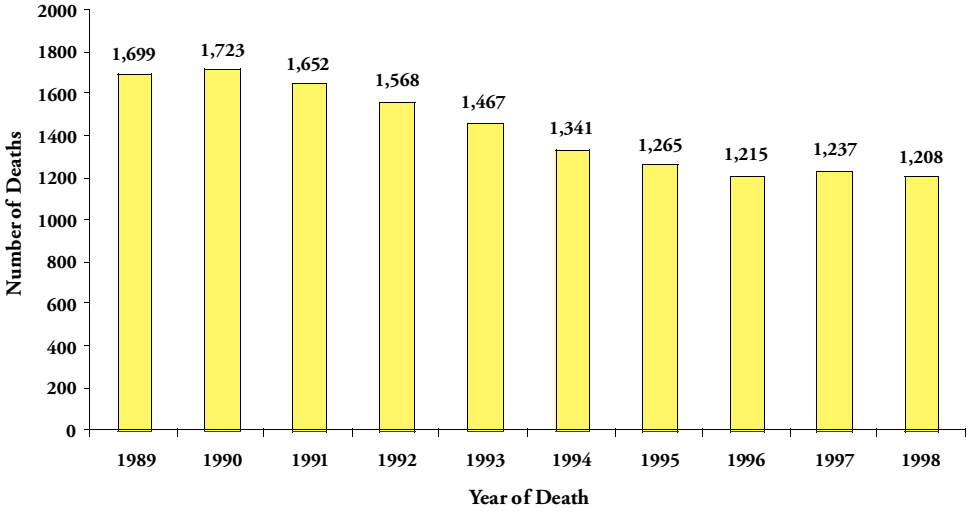
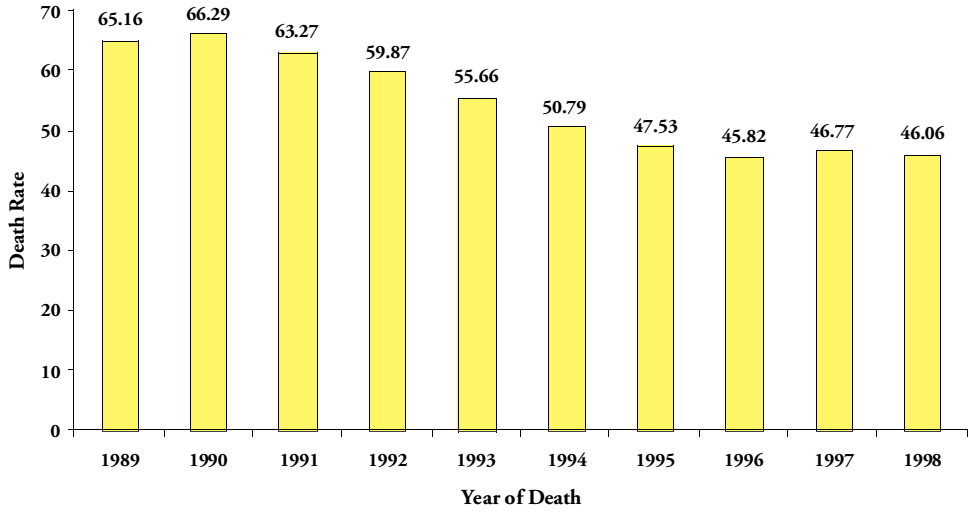
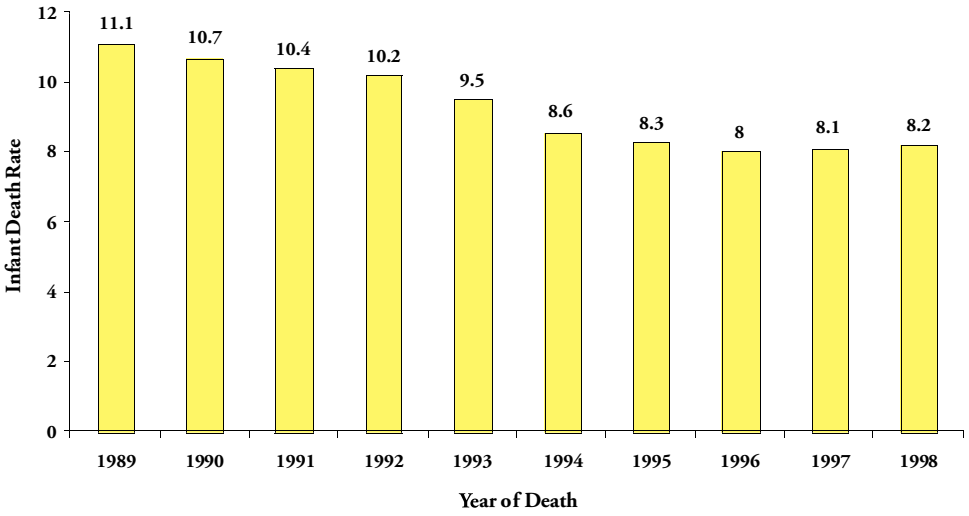


Figure 15. Michigan Natural Child Death Rates* Other than SIDS, Ages 0-18, 1989-1998



*per 100,000 of resident population in age group

Figure 16. Michigan Infant Death Rates* Including SIDS, Ages 0-1, 1989-1998



*per 1,000 live births

Figure 17. Michigan Natural Child Deaths Other than SIDS by Cause, Ages 0-18, 1998

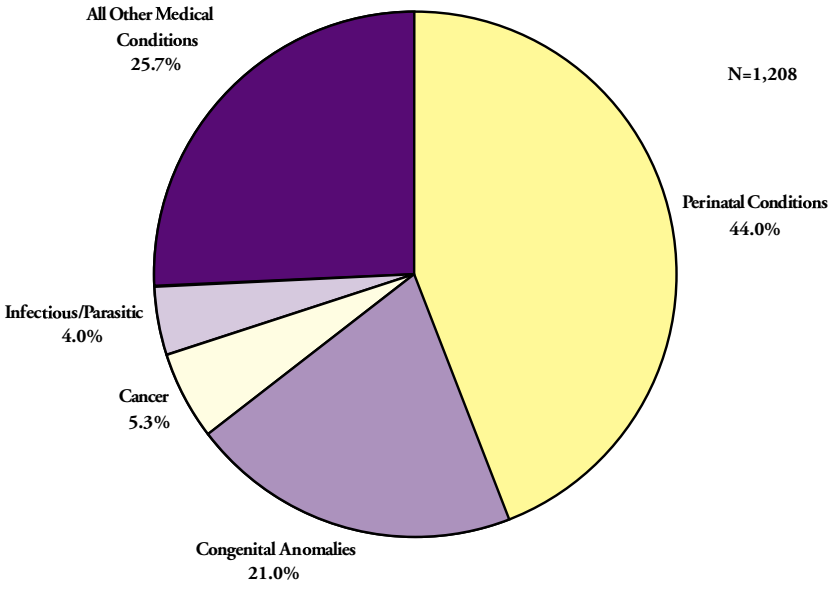


Figure 18. Michigan Natural Child Deaths Other than SIDS by Age, 1998

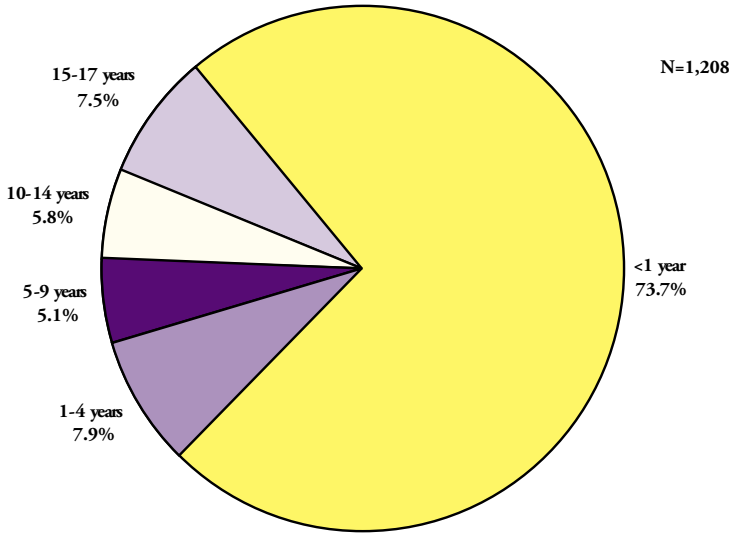
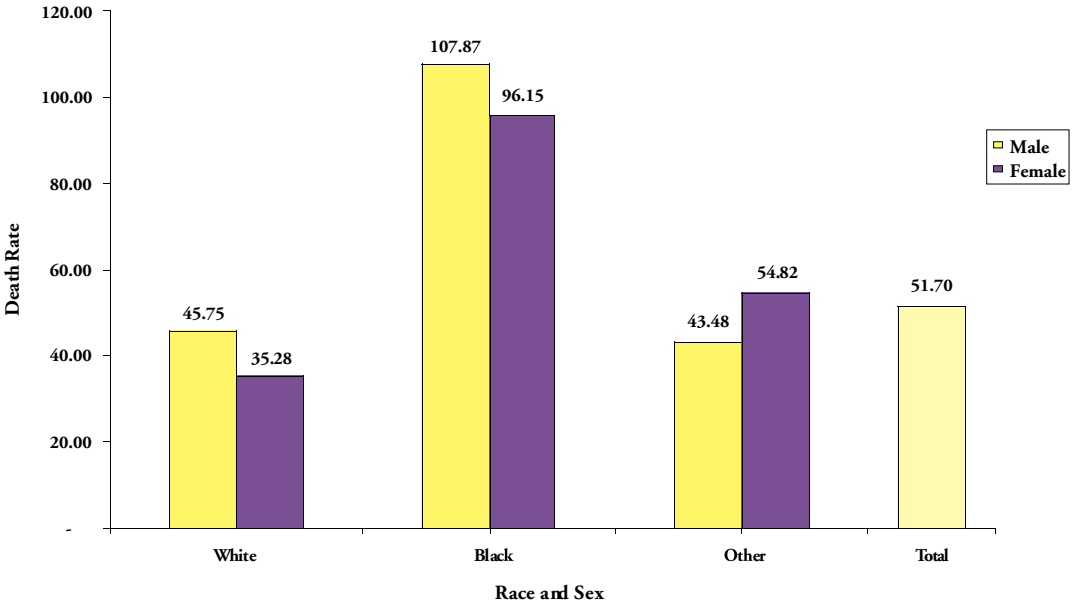


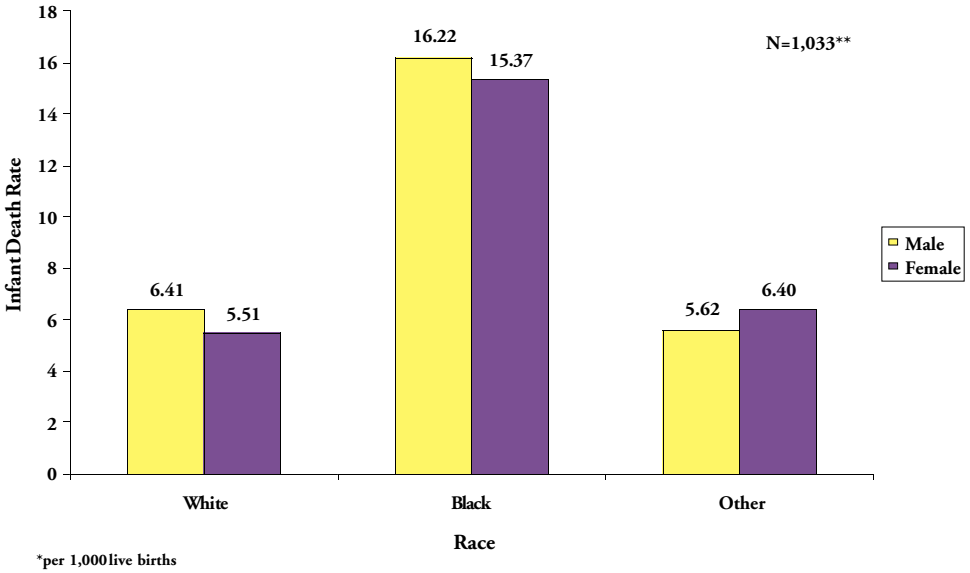
Figure 19. Michigan Natural Child Death Rates including SIDS* by Race and Sex, Ages 0-18, 1998



*per 100,000 of resident population in age group

In 1998, African-American children died of natural causes at 2.5 times the rate of white children.

Figure 20. Michigan Natural Child Death Rates* by Race and Sex, Less than One Year of Age, 1998



*per 1,000 live births

**2 cases with unknown gender and 3 cases with unknown race are not included in this figure.

CHILD DEATH REVIEW FINDINGS IN 1999

Local CDR teams reviewed 135 cases of natural deaths to children under one year of age, other than SIDS. They also reviewed 68 natural deaths to children older than one year. The reviews of natural deaths to children over the age of one included causes related to: respiratory system (15), cancer (13), cerebral (11), congenital abnormality (6), cardiac (5), infections (4), renal (3) and other causes (11). Natural death remains a difficult area for teams to review because of the complex prenatal histories and medical circumstances involved in the deaths, which are often not available to the teams. Access to and collection of prenatal, delivery, NICU and birth records would greatly enhance the information available to teams for natural infant deaths. Specialized FIMR reviews would also assist with this collection of information.

Table 8
Natural Infant Deaths Reviewed by Age at Death

Age	Number of Cases
Fetal	8
0-23 hours	42
24-47 hours	6
48 hours – 5 weeks	30
6 weeks – 5 months	14
6 months – 1 year	13
Missing	22

Table 9
Natural Infant Deaths Reviewed by Gestational Age

Gestational Age	Number of Cases
< 24 weeks	13
24 – 31 weeks	20
32 – 37 weeks	7
> 37 weeks	16
Missing	79

Table 10
Natural Infant Deaths Reviewed by Birth Weight in Grams

Birth Weight in Grams	Number of Cases
< 750	12
750 – 1,499	6
1,500 – 2,499	5
> 2,500	16
Missing	96

Table 11
Natural Infant Deaths Reviewed by Number of Prenatal Visits

Total Number of Prenatal Visits	Number of Cases
None	3
1 –3	5
4 – 6	7
7 – 9	4
> 9	12
Missing	104

Of the deaths in which information was available, the teams found that:

- **Ninety-four infants were white, 28 were black, one was Native American and in four cases the race was unknown. Seventy-two of the cases were male and 59 were female.**
- **Medical risk factors were involved in 82 of 135 cases reviewed.**
- **Information on whether referrals were made to the Medicaid-funded Maternal Support and Infant Support Services (MSS and ISS) was known in 50 cases. In only 10 of the 50 known cases were referrals made.**
- **Degree of preventability was judged by teams to be "probably preventable" in only nine cases, "definitely preventable" in only two. The team was unsure in 30 cases. In 28 cases, no answer was given and in 62 cases, the teams thought the death was "probably not preventable" or "not at all preventable."**
- **Domestic violence was identified as a factor in three of the deaths. In 32 cases, domestic violence was not thought to be a factor in the death and was listed as unknown in 52 cases.**
- **Fifteen of the deaths had past Child Protective Services (CPS) complaints. Eighty-four did not have prior CPS history and in 36 cases the data is missing.**

COMMUNITY ACTIONS RESULTING FROM THE REVIEWS

- *A number of communities organized FIMR teams, and were thus able to apply for and receive state funds to implement more intensive reviews of their infant deaths.*
- *One community reorganized a CDR sub-committee that had been reviewing neonatal infant deaths into a FIMR review team.*
- *One community studied hospital discharge policies and improved their education on infant care practices to new parents prior to their leaving the hospital.*

Recommendations for State Policy Makers

5. **Continue technical and financial support to Fetal Infant Mortality Review Programs (FIMR) in Michigan communities with high infant mortality rates and racial disparities.**
6. **Encourage support of educational, case management and grief services to families who experience an infant death.**
7. **Ensure that all women on Medicaid have awareness to the entire array of Medicaid services, including family planning services.**
8. **Encourage medical care organizations and insurance companies to work with their providers to:**
   - **Ensure early access to and continuity of care for all pregnant women.**
   - **Comply with state laws that require physicians to offer pregnant women client-centered counseling and voluntary HIV testing.**
   - **Improve screening of pregnant women and new parents for domestic violence and substance abuse and assure appropriate referrals to all available services.**
   - **Increase availability of and referrals to risk reduction programs such as the Medicaid-funded Maternal Support Services (MSS) and Infant Support Services (ISS).**
9. **Encourage the distribution of family planning information to new parents in prenatal care, at delivery, in pediatrician offices and at other sites utilized by persons of child bearing age.**

SUDDEN INFANT DEATH SYNDROME

OVERVIEW

Sudden Infant Death Syndrome (SIDS) is defined as the sudden death of an infant under one year of age, which remains unexplained after a thorough case investigation, that includes three parts: a complete autopsy with negative findings, a scene investigation and a review of the medical history. If these three criteria are not met, SIDS should not be the cause of death. Since SIDS is considered a diagnosis of exclusion, all other possibilities must be ruled out.

The "Back to Sleep" Campaign is credited with reducing the number of SIDS deaths by more than 40% nationwide since 1994.

Although autopsies are now routinely performed before a SIDS diagnosis is made, death scene investigations and medical history reviews are often not conducted. It is especially difficult to differentiate between SIDS and suffocation based only on autopsy findings, because neither may have positive findings at autopsy *(see the section on suffocation)*. In many cases, a death scene investigation is the only way that SIDS and suffocation risk factors can be identified.

With some four decades of research completed, we still do not know the cause of SIDS. We are more aware that SIDS probably does not have a simple, singular cause but is most likely an interaction between environmental, physiological and social risk factors.

SIDS deaths have continued to decline nationwide, dropping 12% in 1997 to a record low in the United States. Nationally, SIDS deaths in 1997 totaled 2,705, down from 3,050 in 1996, with a total reduction of 42.3% since 1992.

Many believe the decline is due to the changing practice of putting babies to sleep on their backs. The "Back to Sleep" campaign was launched in 1994 by the American Academy of Pediatrics and the National Institutes of Health. Still, the "Back to Sleep" message is not reaching everyone. African American babies are 2.4 times more likely than white babies to die of SIDS, and Native American babies are 2.8 times more likely to die of SIDS. According to a study in the Journal of the American Medical Association, between 1994 and 1998, 17% of white babies and 32% of black babies were still sleeping on their stomachs. Forty-one percent of the parents that responded to the study said that their physician did not discuss sleep position with them and agreed that a recommendation coming from their doctor would have a strong influence on their decision. The study found that physicians need to make the "Back to Sleep" recommendation to parents as early as possible since the risk of SIDS is greatest in the first few months of life. Findings show that reinforcement of the back sleeping position by physicians and nurses, with support from other sources, is the best way to influence parents to follow this recommendation.

The Consumer Product Safety Commission (CPSC) and Gerber Products also released the results of a national survey highlighting risks to African American babies. Only 31% of the African American parents surveyed put their babies on their backs, and 85% of these babies sleep with soft bedding such as quilts, comforters and pillows in their cribs. Therefore, the CPSC, Gerber and the BET television network are launching a national "Safe Sleep" campaign to help lower the rate of SIDS especially among African Americans. In Michigan, MDCH and the Michigan SIDS Alliance are conducting a major campaign to encourage infant safe sleep practices among African American families.

A new area for concern involves infants in daycare. A study by the Children's National Medical Center found that 20.4% of SIDS cases occurred in daycare settings, often to children without most of the known SIDS risk factors. One suggested explanation is that infants who died in daycare settings were accustomed to sleeping on their backs

at home, and were then placed on stomach sleep positions in daycare. These infants were less capable of moving their heads to breathe freely than were infants who usually slept on their stomachs, and were thus at higher risk.

A number of national studies are beginning to study relationships between SIDS and bed-sharing. Bed-sharing is a term used when an infant sleeps with at least one other person on the same sleep surface. (Co-sleeping is the term used when an infant sleeps near another person but not always on the same bed surface.) Although bed-sharing alone is not listed as a risk factor for SIDS, it is often associated with other risk factors, including stomach sleep position, heavy and/or soft bedding and second-hand smoke exposure. Results of a major study of 119 SIDS, suffocation and undetermined infant deaths published in the September 2000 issue of *Pediatrics*, found that 47.1% of the infants were bed-sharing; and 75.9% of the 119 infants were sleeping on a surface not designed for infants.

In early 1999, the CPSC joined forces with the American Academy of Pediatrics and others in issuing new guidelines for infant safe sleep environments. Ann Brown, Chairman of the CPSC, in issuing the new guidelines, encouraged families to change habits: "Don't sleep with your baby or put the baby down to sleep in an adult bed. The only safe place for babies is in a crib that meets current safety standards and has a firm, tight-fitting mattress. Place babies to sleep on their backs and remove all soft bedding and pillow-like items from the crib." *(See section on suffocation.)*

Maternal smoking during pregnancy and second-hand smoking in the infant's environment have also emerged as risk factors in several epidemiological studies of SIDS. An infant of a mother who smokes has almost a five times greater risk of SIDS than an infant of a mother who does not smoke. And while scientists are finding it difficult to distinguish between the effects of prenatal smoking by the mother and second-hand postnatal exposure, it is generally believed that prenatal smoking is the greater risk factor.

MAJOR RISK FACTORS

- ***Sleeping on the stomach or side.***
- ***Soft sleep surfaces and loose bedding.***
- ***Overheating and use of heavy bedding.***
- ***Prenatal smoking and second-hand smoke exposure after birth.***
- ***Sleeping in crowded conditions with other people and/or objects.***
- ***Preterm birth and low birth weight.***

PREVENTION STRATEGIES THAT WORK

- ***The "Back to Sleep" campaign.***
- ***Specific messages targeted to families and childcare providers who traditionally practice stomach sleep positions.***
- ***Smoking cessation education and support for pregnant and parenting women and other caregivers.***
- ***Education to health care providers on giving guidance on SIDS risk reduction to parents and caregivers.***
- ***Crib distribution programs for families seeking safer sleep environments.***
- ***Licensing requirements for daycare providers on safe sleep environments and infant sleep positions.***

Three Michigan Children who Died in 1999

- **A three-month-old baby boy was put down for a nap in a crib at his new caretaker's home. When the caretaker went to check on the baby, he was found face down with a bloody froth around his face. This was only the second time the baby had been to this caretaker, and he had never slept on his stomach before.**

- **A three-month-old baby girl was put to sleep on a hide-a-way bed. The mother awoke at 5:00 a.m. to check on the baby. She found her baby sleeping face up, covered with a blanket. There was no crib in the apartment. The medical examiner made a referral to the SIDS Alliance for grief support services.**

- **A five-month-old baby boy was sleeping between his parents in their waterbed. The baby was on his back. When the parents awoke at 8:00 a.m., they found the baby not breathing, cold and limp with a small amount of clear drainage from his nose. Following resuscitation efforts, he was pronounced dead at the hospital. The baby was born premature and was on an apnea monitor.**

MICHIGAN MORTALITY DATA: 1989-1998

Figure 21. Michigan Sudden Infant Death Syndrome Deaths, 1989-1998

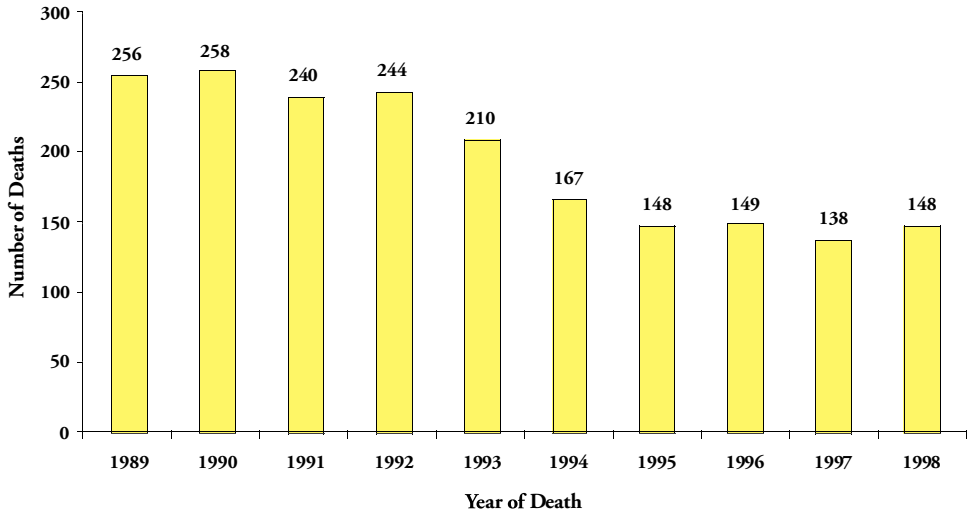
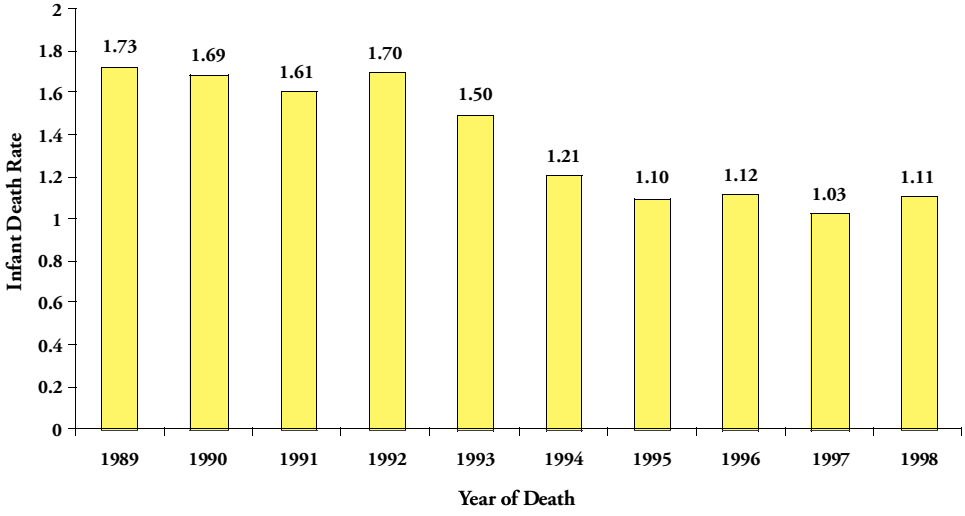
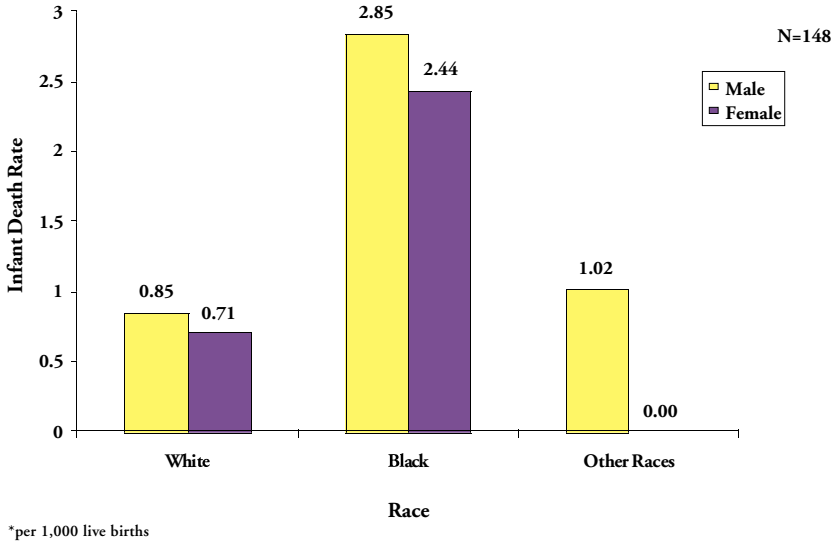


Figure 22. Michigan Sudden Infant Death Syndrome Death Rates*, 1989-1998



*per 1,000 live births

Figure 23. Michigan Sudden Infant Death Syndrome Death Rates* by Race and Sex, 1998



*per 1,000 live births

CHILD DEATH REVIEW FINDINGS IN 1999

Only eight of the 63 SIDS babies were sleeping in cribs, alone and on their backs. 48% of the SIDS babies were sharing a bed with other family members.

Teams reviewed 63 SIDS deaths in 1999. Although the safest place for a baby to sleep is in a crib, on the back and alone, only 16 of the 63 babies were sleeping in a crib. Twenty-one were sleeping on their backs when found. Only 26 of the babies were sleeping alone. Forty-eight percent were sharing a bed with other family members. It was reported that only 22 babies normally slept on their backs, or 43% of the white babies and 21% of the black babies. Forty-three percent of white babies were bed-sharing, and 60% of black babies were bed-sharing with other family members.

Table 12
SIDS Deaths Reviewed by Infant Sleeping Location

Sleeping Location	Number of Cases
In Crib	16
In Other Bed	16
Other	14
Missing	8
On Couch	5
In Playpen	2
On Floor	2

Of the cases reviewed, 44% of the babies lived in smoke-filled environments. Mothers were known to have smoked during pregnancy in 22 cases. In 29 cases, the information was not available.

While the majority of the deaths occurred in the child's home, seven of the 63 deaths (11.1%) occurred in a daycare setting. Four of these babies normally slept on their backs and two of them were found on their backs at daycare.

Comprehensive scene investigations and reviews of medical histories are critical to determine the actual cause of death and to better target prevention programs. Yet case reviews found that complete investigations were often lacking. Scene investigations were conducted by either medical examiners (25 cases) and/or by law enforcement (44 cases). Six cases did not have any death scene investigation. Of the cases that did have a scene investigation, many times this only involved interviewing the parents at the hospital. Because of this, many important pieces of information were missing, including questions regarding the baby's sleeping environment. In eight of the cases, the medical examiner did not review the medical history of the infant.

Review teams found that in 13 of the 63 SIDS cases, an investigation by CPS was conducted after the death. Two of the cases led to findings of chronic neglect and other children were removed from those homes after the deaths.

COMMUNITY ACTIONS RESULTING FROM THE REVIEWS

- *Many counties now require the use of the State of Michigan Protocols to Determine Cause and Manner of Sudden and Unexplained Child Deaths.*
- *One county is planning to develop a countywide investigative unit for sudden and unexplained infant deaths.*
- *Several counties are working with their local media to encourage families to follow the CPSC recommendations for a safe sleep environment for infants.*
- *Many counties are participating in the MDCH and Michigan SIDS Alliance program to train bereavement specialists to work with SIDS families.*
- *Several counties have developed SIDS awareness campaigns, including distribution of "Back to Sleep" brochures in kits for new mothers and education with hospital staff.*
- *Three counties implemented loan-a-crib programs for families needing cribs.*

"Our review team initiated a number of efforts that built on lessons we learned at our meetings. Our "Back to Sleep" campaign and our infant crib program show what a community partnership can accomplish."

Janeane Morrissey
FIA
Muskegon

Recommendations for State Policy Makers

Note: These recommendations are the same as those for Suffocation

10. **Require the use of existing protocols for the investigation of all sudden and unexpected child deaths (including autopsy, scene investigation and review of medical history) modeled after the *State of Michigan Protocols to Determine Cause and Manner of Sudden and Unexplained Child Deaths.***
11. **Study the merits of mandating autopsies for all sudden and unexplained child deaths.**
12. **Offer and encourage training for medical examiners and law enforcement personnel in the thorough investigation of child deaths.**
13. **Institute a practice in the Division for Vital Records and Health Statistics (DVRHS) of notifying the appropriate local medical examiner whenever a death certificate is received which shows SIDS as the cause of death, but for which no autopsy was done, and/or the medical examiner had not been involved with the case. DVRHS should encourage a comparable practice with offices of county and city registrars.**
14. **Build upon the success of the statewide "Back to Sleep" campaign to emphasize safe infant sleeping environments following the recommendations of the Consumer Product Safety Commission, and include a special focus on babysitters and childcare providers.**
15. **Incorporate SIDS risk reduction and safe infant sleep materials in Michigan's statewide prenatal smoking cessation programs.**
16. **Encourage all health care professionals to reinforce the "Back to Sleep" message with parents and caregivers at every opportunity for contact.**
17. **Provide and reinforce safe infant sleep messages to all parents and caregivers.**

MOTOR VEHICLE

OVERVIEW

Car crashes are the number one cause of death to teenagers, and the number one cause of unintentional death to all children.

Motor vehicle deaths include all deaths occurring to children who are drivers, passengers, pedestrians or other types of occupants in a form of transport. This includes cars, trucks, bicycles, trains, snowmobiles, buses and all-terrain vehicles. For the purposes of this report, motor vehicle deaths will be separated into two categories, those occurring to children under 16 and those to children who are of the legal driving age.

Children Under 16

In an average week in Michigan, four to five children die in motor vehicle crashes.

Motor vehicle crashes are the leading cause of unintentional death for children over the age of one in the U.S. and Michigan. Every day an average of seven children, ages 0-14, are killed and another 866 are injured in motor vehicle crashes across the U.S., while in Michigan on average, four to five children die each week.

Child restraints are considered the single most valuable tool in preventing these deaths, but they must be used and used correctly. Additionally, safety experts now urge that children ride in the back seat of vehicles, as air bags are hazardous to infants and children ages 12 and under.

Children are also at risk outside of vehicles. In 1998, 761 child bicyclists were killed in the United States. Children under the age of 14 accounted for 212 (28%) of these fatalities, making this one of the most frequent cause of injury-related death for young children. Research has shown that universal bicycle helmet use by children ages 4-15 would significantly reduce deaths and injuries. National data indicate that bicycle helmets are 85-88% effective in decreasing the severity of head and brain injuries, making the use of bicycle helmets the single most effective way to reduce head injuries and fatalities resulting from bicycle crashes.

Children 16 and Older

Motor vehicle crashes are the leading cause of death for teenagers in the U.S. and in Michigan. In 1997, 5,477 young people (passengers and drivers ages 15-20) died in motor vehicle crashes in the U.S. Young people ages 15-20 make up 6.7% of the total driving population in this country but are involved in 14% of all fatal crashes. Teen drivers, by definition, are inexperienced drivers. Their inexperience compounds a number of risk factors that places them at increased risk for fatalities. These risks, as identified from national data, include:

- Speeding: police reports indicate that 36% of all 16-year-old drivers in fatal crashes during 1998 were either exceeding the speed limit or driving too fast for road conditions.
- Single-Vehicle Crashes: in 1998, 41% of the fatal crashes involving 16-year-old drivers involved only the teen's vehicle, and 41% of those occurred between 9:00 p.m. and 6:00 a.m.
- Alcohol Use: 13% of 16-year-olds killed in 1998 crashes had positive blood alcohol concentrations; this number increased to 32% for older teenagers.
- Seat Belt Usage: in 1997, over 60% of youth ages 16-20 that died as passengers in vehicle crashes were not wearing seat belts.
- Passenger Deaths: 65% of teen passenger deaths occurred when another teenager was driving.

MAJOR RISK FACTORS

Children Under 16

- ***Children riding in the front seat of vehicles.***
- ***Not using or improper use of appropriate child restraints.***
- ***Not wearing adequate safety equipment, especially bicycle helmets.***
- ***Unskilled and young drivers of recreational vehicles, including snowmobiles, all terrain vehicles and dirt bikes.***

Children 16 and Older

- ***Exceeding safe speeds for driving conditions.***
- ***Riding as a passenger in a vehicle with a new driver.***
- ***Riding in a car with three or more passengers.***
- ***Driving between 12 midnight and 6:00 a.m.***
- ***Not using appropriate restraints.***
- ***Using alcohol while driving, or riding with someone who is under the influence of alcohol.***
- ***Riding in the bed of a pickup truck.***

PREVENTION STRATEGIES THAT WORK

Children Under 16

- ***Lower Anchors and Tethers for Children (LATCH):***

  Beginning September 1, 1999, the United States Department of Transportation began requiring all new child safety seats to meet stricter head protection standards. The National Highway Traffic Safety Administration (NHTSA) estimates that once the LATCH system is completely phased in, the lives of as many as 50 children a year may be saved and injuries may be reduced by 3,000 annually.

- ***Education to Increase Booster Seat Usage:***

  All children should ride in proper restraints in the back seat of a car. Children between 40 and 80 pounds (usually from four to eight years of age) should be restrained in a belt-positioning booster seat with the vehicle's lap and shoulder belts.

- ***Child Safety Seat Inspection Programs:***

  Point of sale information is now widely available at car dealerships regarding the proper use of and need for child safety seats. A number of innovative programs sponsored by DaimlerChrysler, Ford and General Motors train dealers and others to provide on-site safety seat inspection and training. Many communities have programs that provide free or low-cost seats to families in need.

- ***Bicycle Helmet Laws:***

  As of January 2000, 16 states have enacted age-specific bicycle helmet laws. Most of these laws cover bicyclists under age 16.

- ***Truck Bed Laws:***

  States have addressed the hazard of riding in cargo areas with a variety of laws, most of which are designed to protect children, but few of which provide comprehensive protection for all children younger than 16. Strong laws prohibiting children from riding in truck beds have proven promising. KIDS AREN'T CARGO is an education campaign discouraging truck bed riding.

Michigan's Graduated Licensing Program for young drivers is a national model.

Children Over 16

- ***Graduated Licensing:***

  Michigan was one of the first states to implement graduated licensing and serves as a model for other states. Now 36 states are instituting a graduated licensing process. Sample restrictions may include: supervised practice; remaining crash and conviction free for a minimum of six months; passenger restrictions; night time driving restrictions and mandatory seat belt use for all occupants. States that have conducted evaluations have shown a definite effectiveness including one state with a five percent reduction in teen crashes and another with a 16% reduction in crashes for young male drivers.

- ***Teen Driver Programs:***

  Programs to monitor teenage driving habits are also promising. A program called Street Watch makes postcards available at community locations. The postcards enable anyone who witnesses alarming teen driving behavior to fill out a card and send it to the program. The information will be recorded and forwarded to the appropriate law enforcement agency. Usually, a law enforcement agency representative will pay a visit to the home of the reported driver. While the teen is not ticketed, a visit to his or her home by a police officer can be just as effective. Another teen driver program is called SAV-TEEN. This program sends a teen an individually numbered bumper sticker for display on the teen's car. If another driver observes poor driving habits, they report it to a toll-free hotline. This information is then reported to the parents or owner of the car.

- ***Education to Increase Seat Belt Usage:***

  Studies show that education to both children and adolescents regarding the importance of seat belt use is effective in increasing usage. Focusing this education on adolescents is especially important in that teens are often driving without their parents, and are responsible for their own decision making on seat belt use.

  Activities shown to be effective include:

  - Encouraging health care providers to assist in delivering passenger safety messages during health care visits.
  - Providing seat belt and child safety seat training for school health/safety officials and educators.
  - Requiring students who park on school property to use seat belts and monitoring results.

Five Michigan Children who Died in 1999

- **A 15-year-old boy was a passenger in a sport/utility vehicle (SUV) driven by his friend. His friend had just received his license a few weeks prior to the crash. He was travelling at a high rate of speed on a gravel road when the SUV rolled over as it was going around a bend in the road. The boy was not wearing his seat belt and was pinned under the vehicle from the waist down. He was alert as the rescue workers used the Jaws of Life to free him, but he died en route to the hospital.**

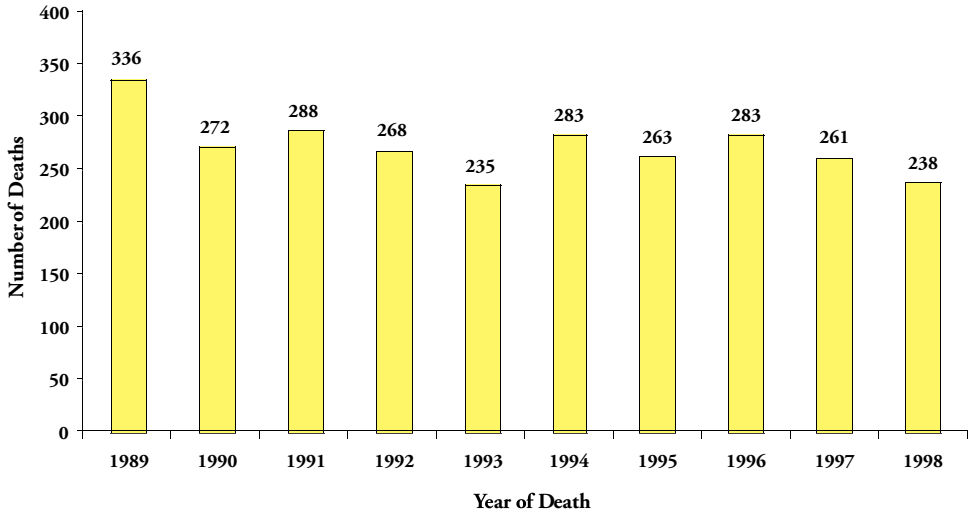
- **A 16-year-old girl was a passenger in her friend's car. There were four girls in the car, and the driver was 17. They had been cruising, calling out the window to a boy who lived on that street. Their vehicle struck a tree. The girl was pinned inside the car. She was not wearing a seatbelt and died later of multiple injuries.**

- **A three-year-old boy was in the back seat of his dad's car. He was not wearing a seat belt. His father was driving with a suspended license. A driver, who was exhausted after working two shifts, hit them from behind when they stopped suddenly at a red light. The driver reported that he was momentarily distracted. The boy died from head injuries.**

- **A seven-year-old girl was riding her bike with her father on a rural gravel road. She was not wearing a helmet. Two cars drove down the road at a high rate of speed; the first car created a cloud of dust that prevented the second driver from seeing her. She was struck from behind and hit her head on a large rock when she landed. It is believed that she would have lived had she been wearing a helmet.**

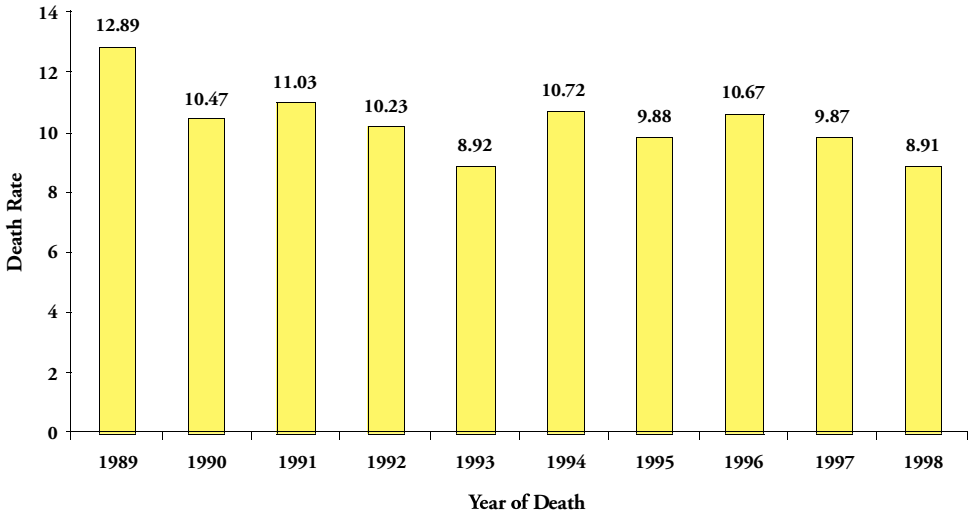
- **A 17-year-old boy was a passenger in the bed of a pickup truck. There were three teens in the cab of the truck and four other teens in the bed of the truck. The 18-year-old driver was told to slow down on several occasions by the victim, but the driver eventually lost control of the truck. The boy was thrown from the bed of the truck and was pronounced dead at the scene.**

Figure 24. Michigan Child Deaths Due to Motor Vehicle Crashes, Ages 0-18, 1989-1998



Includes ICD codes: E800.0-E849.9

Figure 25. Michigan Child Death Rates* Due to Motor Vehicle Crashes, Ages 0-18, 1989-1998



*per 100,000 of resident population in age group

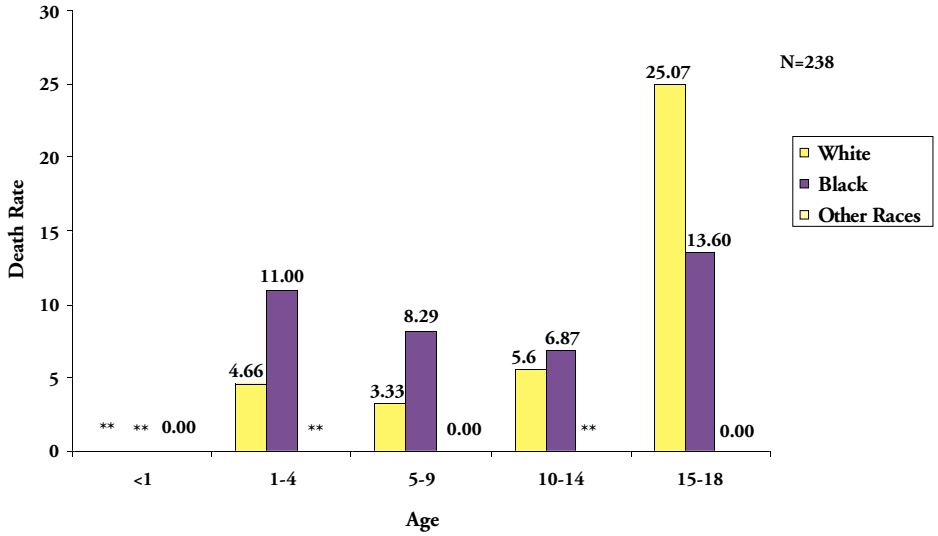
Includes ICD codes: E800.0-E849.9

Figure 26. Michigan Child Deaths Due to Motor Vehicle Crashes by Role in Crash, Ages 0-18, 1998

Role in Crash	Number of Deaths
Child as passenger of car or truck	49
Child as driver of car or truck	37
Child as pedestrian	32
Child on bike	8
Child on motorcycle	3
Child on off-road vehicle	1
Child as pedestrian, collision with train	1
Child as passenger, collision with train	1
Child in car or truck, unspecified position	91
Other	15

Includes ICD Codes: E800.0-E849.9

Figure 27. Michigan Child Death Rates* Due to Motor Vehicle Crashes by Age and Race, 1998

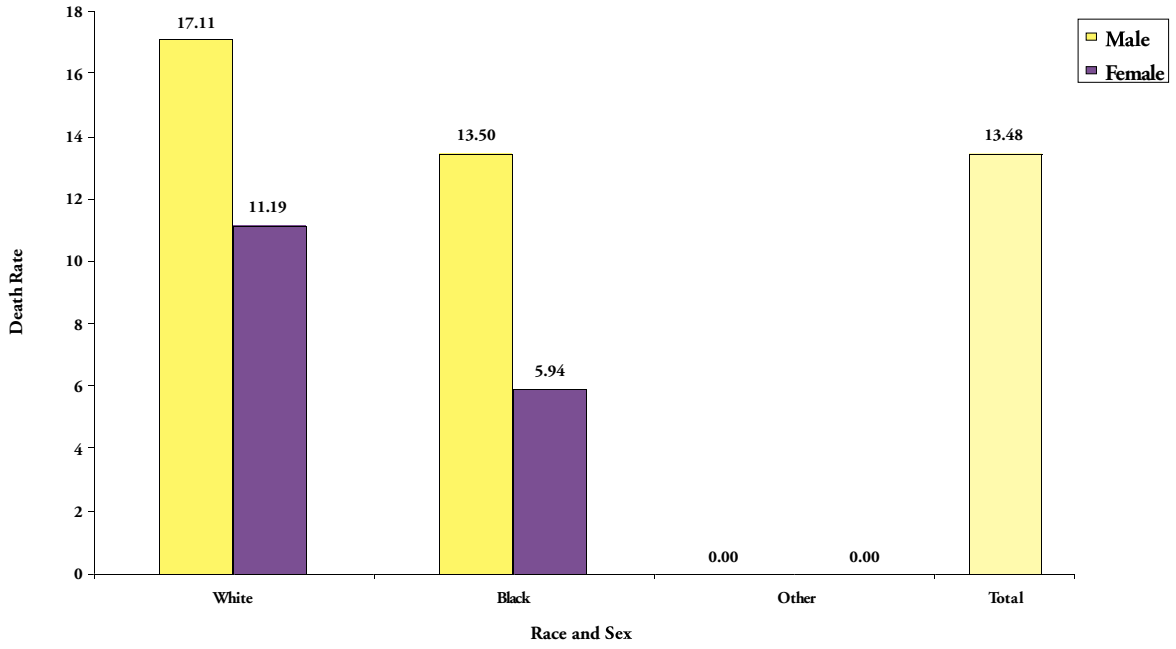


*per 100,000 of resident population in age group

**Other Race Numbers are too small (<6) to calculate rate.

Includes ICD codes: E800.0-E849.

Figure 28. Michigan Child Death Rates* Due to Motor Vehicle Crashes by Race and Sex, Ages 10-18, 1998



*per 100,000 of resident population in age group

CHILD DEATH REVIEW FINDINGS IN 1999

Local child death review teams examined 123 cases of motor vehicle deaths during 1999. Seventy males and 47 females were killed in these crashes. Eighty-nine deaths, or approximately 72%, were to children over nine years of age, and 50% of the victims were teens between 15 and 19 years of age.

Table 13
Motor Vehicle Crash Deaths Reviewed by Age and Sex

Age (years)	Male	Female	Missing	Total
<1	1	2	0	3
1-4	7	7	0	14
5-9	9	11	1	21
10-14	16	5	0	21
15-19	37	22	2	61
Missing	0	0	3	3

The age of the driver at fault highlights the risk factors to adolescents. Cases where the driver at fault was 16-18 years of age comprised one-third of the deaths. Many of these deaths were to children who were passengers in cars being driven by a friend who had recently received his or her license. Additionally, and consistent with national data, many of these crashes occurred when there were more than two young passengers in the vehicle and at a late hour.

Of the 13 cases in which the driver was under the age of 16, six and possibly seven deaths were to teens ages 14 and 15 who were joy-riding in stolen or borrowed cars. In one case, four 14-year-olds died after speeding away in a stolen car and hitting a tree. Teams felt that three of these teens could have been saved if they had worn seat belts. Three young teens were killed while driving recreational vehicles: one moped, one dirt bike and one go-cart. In three of the 13 cases, the young teen drivers were alcohol-impaired.

In one-third of the cases reviewed, teens were driving the car that killed them or other teens as passengers.

Table 14
Motor Vehicle Deaths Reviewed by Age of Driver at Fault

Age of Driver at Fault	Number of Cases
<16	13
16-18	41
19-24	14
25-35	7
36-59	17
>59	6
No Answer	25

The findings for primary cause of crash are different for males and females. Males were more likely to be driving at a high speed (15 males to six females). This finding is also supported by national data. Driver error, involved in almost 40% of all deaths, was higher for females than for males (28 females to 18 males). Where teams noted the cause of the crash, driver error declined as the age of the driver at fault increased.

The lack of seat belt use is a significant risk factor for mortality. One-third of the children under age 16 had a restraint present in the vehicle, but they were not using them at the time. In only 25% of the cases reviewed did the child who died use a seatbelt or child seat correctly. Almost 50% of youth ages 15-19 had a seat belt present, but did not use it. Additionally, males used restraints less frequently than females. Twenty-three males had a seatbelt present but did not use it compared to 16 females.

Fifty percent of the teens who died were not wearing their seat belts. One-third of the children under 16 who died were not using a restraint, or the restraint was used incorrectly.

Table 15
Motor Vehicle Crash Deaths Reviewed by Age and Restraint Use

Age	Present, Not Used	None in the Vehicle	Used Correctly	Used Incorrectly	Missing	Total
<1	1	1	1	0	0	3
1-4	2	1	4	1	6	14
5-9	2	1	5	0	11	19
10-14	5	4	3	0	8	20
15-19	30	3	18	1	9	61
Missing	0	0	0	0	6	6

Alcohol was involved in 22% of the deaths. Sixty percent of the teens, ages 16-18, who were driving in a fatal crash were alcohol-impaired.

In 22% of the fatalities, the child or the driver of the child's vehicle was alcohol-impaired at the time of the crash. Eighteen of the 54 teen drivers involved in fatal crashes were alcohol or other drug-impaired at the time of the crash, representing 33%; yet 15 of the 25 teen drivers ages 16-18 were alcohol-impaired, representing 60% of these deaths.

Eighty-five percent of all motor vehicle crash deaths reviewed were identified as either "definitely preventable" or "probably preventable" by the teams. The largest risk factors for fatalities include behavioral (78.9%), drugs/alcohol (21.1%) and environmental (14.6%) issues.

"In most of the car crashes we reviewed, a teen's inability to handle off-road recovery was identified as a contributing factor. Our team sent letters to all the driver's education instructors in our community urging them to emphasize this skill in their curriculum."

Peggy Conrad, RN
Public Health
Livingston County

COMMUNITY ACTIONS RESULTING FROM THE REVIEWS

- ***Communities advocated for the redesign of roads and made traffic sign improvements.***
- ***Local police departments became involved with ongoing traffic and driver safety campaigns.***
- ***Driver's education programs used specific crashes in the community to raise awareness in other teen drivers.***
- ***A Michigan State Police trooper conducted a safety education event in an elementary school.***
- ***New DARE and PRIDE activities were initiated in communities.***
- ***One community formed a substance abuse action team to address teen drunk driving.***
- ***One community conducted an education program for employees of the fire department and EMS who respond to motor vehicle crashes.***

Recommendations for State Policy Makers

18. **Ensure the enforcement of new legislation that makes it illegal under certain conditions to ride in the back of a pickup truck.**
19. **Encourage communities to include information in driver's education courses about the dangers of driving at high speeds on gravel roads or in other poor road conditions, and expand education on reckless driving.**
20. **Support steps to enforce and strengthen the current graduated licensing law in Michigan to include:**
    - **Ensure enforcement of the current requirement that parents *document and certify* that their children accumulated at least 50 hours of driving experience on Level One Learner's Licenses prior to being awarded Level Two Intermediate Licenses.**
    - **Amend the current law to include restrictions on the number of young passengers allowed in vehicles driven by teens with Level Two Intermediate Licenses.**
21. **Encourage auto dealerships to provide point-of-sale information resources about proper installation and usage of child safety seats and booster seats when selling new or used vehicles.**

FIRE

OVERVIEW

The U.S. has one of the highest fire death rates in the industrialized world. Fires and burns remain the third leading cause of unintentional injury-related death among children ages 14 and under. Over 80% of these fire deaths occur in residences, and most residential fires occur in older, wood-frame housing.

Poor children ages 0-4 are at the highest risk of dying in a house fire, especially if they live in older, wood-frame houses.

Poor children are at especially high risk of fire death. They often live in older, substandard housing; their homes often lack working smoke alarms and their families are more likely to use alternative heating sources. Furthermore, economic constraints can limit adequate adult supervision (i.e., children cooking meals while their parents work).

Although most residential fires originate in the cooking area of a home, the majority that result in child fatalities start in either the family room area or sleeping area. Common sources of ignition in all fatal fires include cooking and heating implements, cigarette smoking materials, candles and faulty wiring.

Children playing with fire-starting materials cause a significant number of the fires in which children die. Matches and lighters are the first and second most common ignition sources in fires started by children, and over half of these fires originate in sleeping areas. Young children often play with matches or lighters while in their bedrooms to conceal their activities, and then they hide in closets or elsewhere when the fire breaks out. As a result, others in the home or rescue personnel cannot locate them in time to save them.

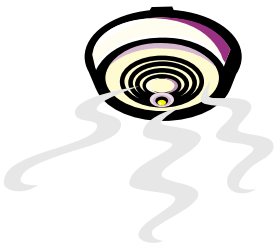
There have been recent findings of fire deaths caused by highly flammable and toxic polyurethane foam materials used in upholstered furniture. This foam can ignite very readily and create very high heat and extremely toxic fumes. The CPSC is studying recommendations by the National Association of State Fire Marshals to require that warning labels be placed on furniture made of this foam.

Smoke and fire detectors and sprinkler systems are the most effective means with which to prevent fire deaths. One important case-control study found that a working smoke detector decreased the risk of a fire fatality in 71% of house fires. National data show that nearly three out of every five residential fire deaths occurred in the small number of homes in the U.S. (only seven percent) that had no smoke alarms present. Although 93% of the homes in the U.S. had at least one smoke alarm, only 74% of all homes had at least one working smoke alarm. Because this study excluded households without telephones, the prevalence of smoke alarms is probably overestimated.

The chances of dying in a residential fire are cut by an estimated 62% when automatic sprinkler systems are present. Smoke alarms and sprinkler systems combined could reduce fire-related deaths by 82%. New technologies that improve fire alarms are expected to increase the prevalence of working fire alarm systems in homes. These include ten-year, non-removable batteries in smoke detectors, sprinkler systems and smoke detectors that are hard-wired into new homes.

In Michigan, MDCH is completing the first year of a three-year smoke alarm distribution project. They have distributed and installed more than 2,000 lithium battery-powered smoke detectors in high-risk homes, in four targeted Michigan communities.

The City of Grand Rapids passed an ordinance in 1999 requiring that all homes, including pre-existing residences, install hard-wired smoke detection systems by the end of 2000. Child death review team findings from a large number of residential fires in 1995-1999 were key in the effort to pass this ordinance.



Fire escape preparedness is an important prevention strategy, yet a national survey about fire safety behaviors found that only 53% of Americans have a family escape plan and of those, only 16% have practiced it. Further, those with household incomes of at least $45,000 a year are more likely than those with lower incomes to have an escape plan and to have practiced it. The survey also found that everyone, including preschoolers, could be taught the basics of home fire escape.

Many fires result in multiple deaths. Alcohol use by adults is a high risk factor in these deaths. An impaired person is not able to respond quickly in alerting and/or in helping others to safety. Alcohol also can play a part in the negligence that results in a fire being started.

MAJOR RISK FACTORS

- ***Children under the age of five have twice the risk of the general population.***
- ***African American and Native American males under the age of four have nearly six times the risk as the general population.***
- ***Children from low-income families.***
- ***Homes without working smoke alarms.***
- ***Homes that use alternative, faulty or older heating sources.***
- ***Economic constraints that limit adequate adult supervision of young children.***
- ***Children living in older houses, rental units, mobile homes and houses without telephones.***
- ***The presence in the home of an alcohol-impaired person.***

PREVENTION STRATEGIES THAT WORK

- ***Legislation requiring installation of smoke detectors in new and existing housing when combined with multi-faceted community education and smoke detector distribution campaigns.***
- ***Give-away programs in high-risk neighborhoods of smoke detectors with non-removable, long-life batteries.***
- ***Local ordinances and enforcement of state building codes to include smoke detector installation and inspection provisions, especially in older housing and rental properties.***
- ***Local ordinances and enforcement of state building codes to inspect and require repair or replacement of sub-standard heating and electrical equipment/wiring.***
- ***Product modification to ensure that cigarette lighters are childproof.***
- ***Product modification and regulation to require that cigarettes be self-extinguishing.***
- ***Personal safety curricula, such as Risk Watch for preschool through middle school students.***
- ***Fire department "Smokehouse" programs that teach children how quickly fires can start and spread, as well as the best ways to escape a burning house and the need to practice home escape plans.***

Working smoke detectors decrease the risk of fire death by 71%. Yet in three out of five fatal house fires in the U.S., no detector was present.

Five Michigan Children who Died in 1999

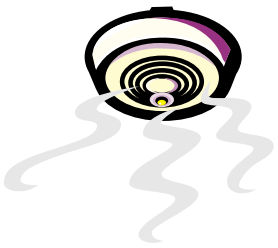
- **Three young children were playing with matches in their home. Their father, who stays home as primary caretaker while their mother works full time, was asleep on the couch. He had been drinking earlier. The father, the four-year-old and the six-year-old made it out of the house, but the two-year-old did not. There were no smoke detectors present in the home.**

- **A group of adolescents were at a friend's house. They were drinking alcohol and smoking until late in the evening. The parents were at home, but not in the area of the house where the teens were hanging out. A cigarette smoldered in a couch and started a fire. The foam inside the couch burned quickly, causing a large amount of noxious smoke and fumes. The home was equipped with smoke detectors, but the batteries had been removed. Four youths, ages 15-17, and the two adults in the home were killed.**

- **An older, wood-frame, rental home became engulfed in flames while the six occupants of the home were sleeping. Although the landlord stated that the house had functioning smoke detectors when he checked it two months earlier, there were no alarms heard by witnesses, nor were any detectors found during the subsequent investigation. One adult escaped by jumping out a second story window. Three other adults and two children under the age of 10 were killed, representing three generations in one family. Victim's Advocates in two counties worked extensively with the relatives after this incident.**

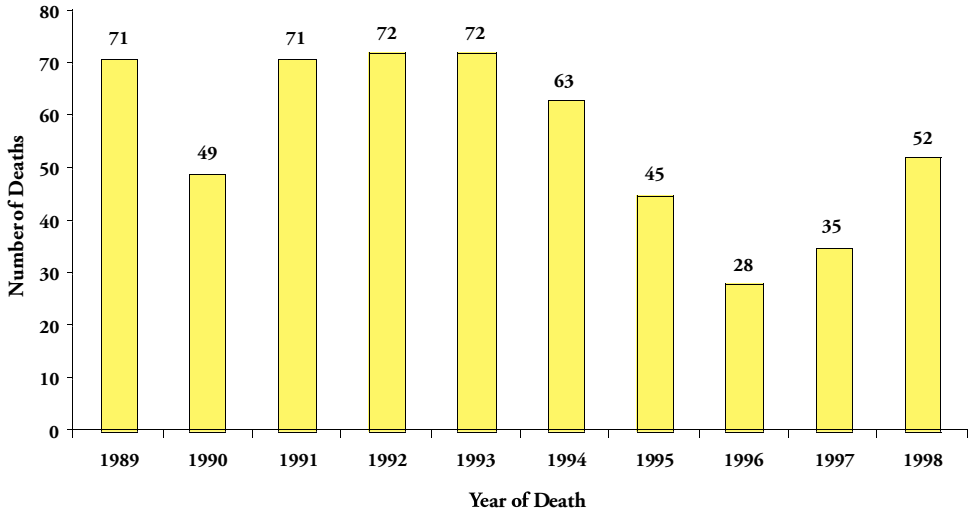
- **Two families were socializing in a suburban home. The children were playing unsupervised with a gas grill lighter while the adults visited in another area of the house. Afraid of getting into trouble, the kids did not inform the adults when the fire started. Of the two smoke detectors that had been present in the home, one had had the battery removed and the other had been taken down entirely. Three children and two intoxicated adults died in this fire.**

- **A six-year-old boy with various health problems lived in an older mobile home with his grandparents. They had removed the batteries in their smoke detectors because the child was extremely sensitive to loud noises and the alarms would sometimes go off when they were cooking. One evening, faulty aluminum wiring in their trailer started an electrical fire. This type of wiring has a history of similar incidents. Neighbors were able to pull the grandparents out in time, but flames blocked the entrance to the child's bedroom. He was found near his bedroom door.**



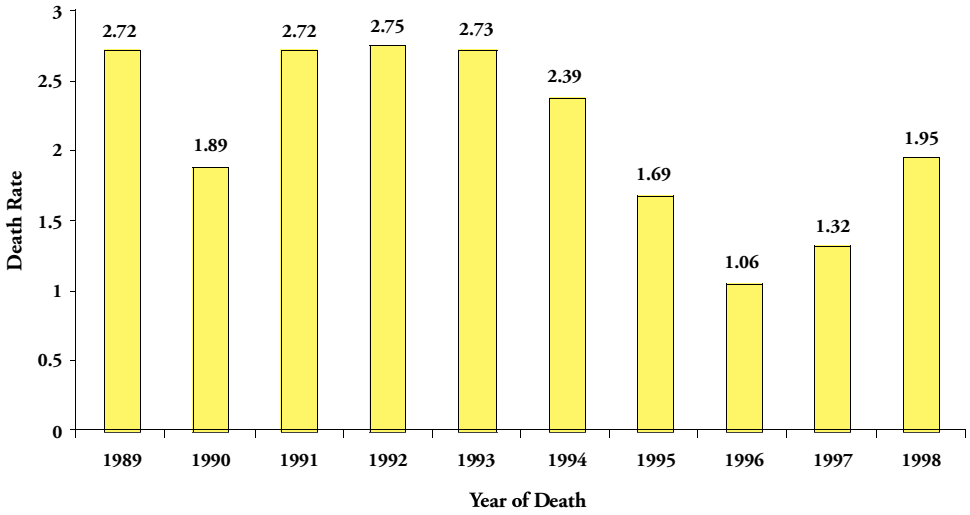
Fire deaths to children increased for the second year in a row. They increased by 46% from 1996 to 1998.

Figure 29. Michigan Unintentional Child Deaths Due to Fire, Ages 0-18, 1989-1998



Includes ICD codes: E890.0-E899.9

Figure 30. Michigan Unintentional Child Death Rates* Due to Fire, Ages 0-18, 1989-1998



*per 100,000 of resident population in age group

Includes ICD codes: E890.0-E899.9

Figure 31. Michigan Unintentional Child Deaths Due to Fire by Age, Race and Sex, 1998

	WHITE		BLACK		OTHER		
Age	Male	Female	Male	Female	Male	Female	Total
<1	3	-	1	-	-	-	4
1-4	7	4	5	2	1	-	19
5-9	3	3	5	8	-	1	20
10-14	3	-	1	2	-	-	6
15-18	2	-	-	-	-	-	2
Total	18	7	12	12	1	1	51*

Includes ICD Codes: E910.0-E910.9
*Age missing in one case

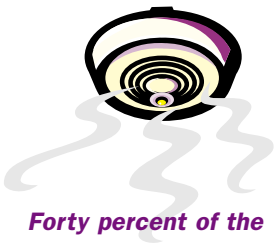
CHILD DEATH REVIEW FINDINGS IN 1999

The review teams found that sixty-seven percent of the children who died in fires were poor.

Teams reviewed 51 deaths to Michigan children due to fire in 1999. These involved many multiple child deaths, as the number of separate fire incidents was only 27. In 14 of the fires, a single child was killed. Each of five separate fires caused two deaths each; five other fires caused three deaths each, and three separate fires claimed the lives of four children each. Young children were particularly vulnerable in the fires.

Table 16
Fire Deaths Reviewed by Age

Age	Number of Cases
< 1	2
1-4	19
5-9	19
10-14	4
15-18	7



Thirty of the children were white, 15 were black, three were Hispanic and three were Native American. Poor children were most often the victims in the fires reviewed. Of the 28 children whose socio-economic status was known at the review, 19 were low-income, nine were middle-income and none of the children were from high-income families.

Note: Because of the high numbers of multiple fire deaths, the following data refers to fire incidence (27) and not the individual deaths (51), unless otherwise noted.

In the 24 incidents where supervision adequacy was noted, only seven were listed as adequate. In 12 of the incidents, the team listed the supervision as inadequate and in five of the incidents, the team was unsure if the supervision was adequate.

The ignition source was known in 22 of the fires. Eleven fires involved children playing with an incendiary device, three were caused by faulty wiring, two were caused by candles, two fires ignited from cigarettes smoldering in a couch, one was cooking-related, one was a gas explosion, one was an arson and one was listed as other. The devices used by the children in the 11 fires included: matches (4), cigarette lighters (4), gas grill lighters (3) and sparklers (1). Two fires (causing seven child and two adult deaths) were reviewed wherein it was believed that foam in the furniture may have been a significant factor in the fatalities.

Eighteen of the dwellings involved were wood frame, one was brick frame, two were trailers, one was a woodshed and one was a fire that started in a parked vehicle.

In only three of the 27 separate incidents were there fully functioning smoke detectors present in the home at the time of the fire. Twelve homes had no detector at all; seven had detectors, but the batteries had been removed prior to the fire; in two fires, there had been a detector present, but it was unknown if it had a battery or was functioning at the time of the fire and in one incident, the smoke alarm itself malfunctioned. In another fire, a teen removed the batteries once the fire had started in order to quiet the alarm, believing he could put the fire out by himself.

The national studies that demonstrate a relationship between poverty and presence of smoke alarms are consistent with the review findings. The children who died in homes that did not have working detectors were poor.

Forty percent of the fires were caused by children playing with matches or other fire-starting device.

There was a working smoking detector in only three of the 27 house fires in which 51 total children died.

Alcohol or drugs were involved in seven fires that resulted in 18 child deaths.

Table 17
Child's Socio-Economic Status by Presence of Functioning Smoke Alarm

Smoke Alarm Functioned Properly	Middle Income	Low Income
Yes	5	0
No	4	14

National studies demonstrate that alcohol use by supervising adults or teens contributes to multiple fire fatalities. The review team findings show that alcohol/drug use was a factor in at least 56% of the multiple fire deaths, or seven fires that resulted in 18 child deaths.

"Our child death review team found that smoke detectors were not present in most of our fatal house fires. Members catalyzed an effort to pass a Grand Rapids City ordinance requiring hard-wired smoke detectors in all residences."

Dr. Vincent Palusci
Pediatrician
Kent County

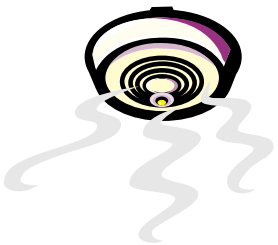
Table 18
Alcohol/Drugs a Factor in Fire by Multiple Injuries or Deaths

Multiple Injuries or Deaths	Unknown if Alcohol/ Drugs a Factor	Alcohol/Drugs not a Factor	Alcohol/Drugs a Factor
Yes	6	7	17
No	1	4	1

In seven of the incidents, there had been prior CPS involvement in the family. In one case, the child who set the fire had been previously referred to a fire-setter program. It was not noted if the child had attended the program.

COMMUNITY ACTIONS RESULTING FROM THE REVIEWS

- ***Several communities initiated fire safety education through the media and in the schools, including education campaigns on the need for smoke alarms, the danger of removing batteries from detectors and fire safety programs for preschoolers.***
- ***One community started smoke detector give-away programs at all area fire stations, as well as school and preschool field trips to fire stations to learn about fire safety.***
- ***One county studied their multitude of local ordinances and practices relating to fire safety and housing inspection, in an effort to craft a county-wide policy.***
- ***Several communities initiated work on new ordinances requiring inspection of rental units and public housing for fire safety.***
- ***One large Michigan city passed an ordinance in 1999 that requires the installation of either hard-wired or sealed lithium battery smoke detectors in all residences by the end of 2000.***



Recommendations for State Policy Makers

22. Encourage tobacco companies to only produce and market cigarettes that are self-extinguishing.
23. Encourage the Consumer Product Safety Commission to require the furniture manufacturing industry to expand the current fire retardant standards for upholstered furniture beyond commercial aircraft and prisons, to include furniture made for residential use.
24. Encourage local building inspection programs to put high priority on home inspections when children are believed to be at risk of environmental hazards.
25. Encourage public education and local ordinances to increase the use of hard-wired or sealed lithium battery smoke detectors and work with manufacturers to discourage the production of smoke detectors with reusable batteries.
26. Expand the number of school districts that participate in *Risk Watch* or similar school-based prevention programs, and encourage communities to include the curriculum in preschool programs and in other childcare settings.
27. Support local fire departments in maintaining and expanding further development of "Smokehouse" or similar programs in Michigan.

DROWNING

Children ages 1-4 are at the greatest risk of drowning, especially in swimming pools with inadequate gates or fencing.

OVERVIEW

Drowning is the third leading cause of injury-related death in Michigan; nationally, drowning is the second leading cause of injury-related death. Childhood drowning can happen within a matter of seconds and usually occurs when there is a lapse in supervision or when supervision is inadequate. Drowning occurs most often in swimming pools, often at the child's own home or at the home of a neighbor or friend. Nationally, more than 85% of drownings among children ages 1-4 are pool-related. Fewer drownings occur when the pool is in-ground and is surrounded on all sides by fencing. These pools have 60% fewer drownings than in-ground pools without fencing.

Children under the age of four are at the greatest risk of drowning. At this age, they are particularly vulnerable for a variety of reasons. Often young children will reach into water either to retrieve a toy or to play, and fall into enough water for the drowning to occur. Young children are also very curious about water, and might not understand the dangers of entering a body of water when unable to swim.

Other than swimming pools, some common places for drowning include open bodies of water such as lakes, ponds and rivers, bathtubs (especially for children under one year of age), buckets, toilets, wading pools, hot tubs and gravel pits. Very young children can drown in as little as one inch of water. Infants who are left unattended in bathtubs can easily slip into the water and are unable to return themselves to a sitting position. The CPSC reports that 300 children in the United States have drowned in bathtubs since 1973.

Swimming instruction, especially to children over the age of four, has been demonstrated to be effective in preventing drowning. The use of personal flotation devices (PFD) is believed to be the number one factor in preventing deaths that occur in open bodies of water.

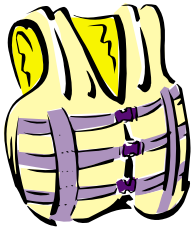
Nationally, alcohol is a major contributing factor in up to 50% of drownings among adolescent boys.

MAJOR RISK FACTORS

- ***Children under the age of four.***
- ***Male children are at higher risk for drowning than female children.***
- ***Inadequate supervision of young children and older children swimming alone.***
- ***Swimming pools that are not properly fenced.***
- ***Lack of awareness of dangerous environmental conditions such as undertows, currents and drop-offs.***
- ***Incorrect or non-use of personal flotation devices.***
- ***Alcohol use while swimming, especially among adolescents.***

PREVENTION STRATEGIES THAT WORK

- ***Public awareness campaigns and water safety classes offered to parents of young children, especially those with an emphasis on the adequate supervision of children.***
- ***Ordinances to enforce building codes, and education for building contractors on pool and hot tub fencing and barriers.***
- ***Public awareness campaigns and promotions by pool supply dealers to encourage use of underwater pool alarms.***

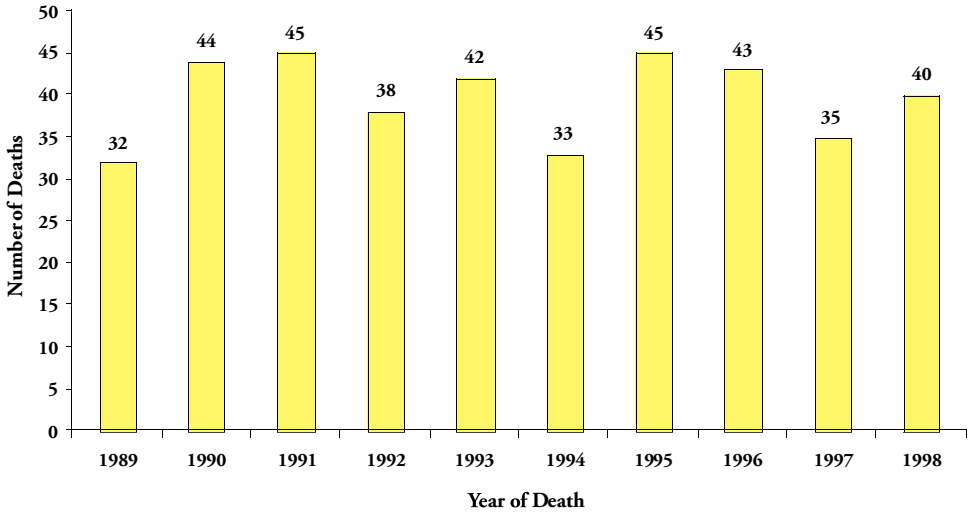


- *Placement of signage near open bodies of water, especially near boat launches and public swimming areas, to warn of possible changes in weather conditions, water current strength and deep water.*
- *Swim classes and water safety classes offered by local agencies and by municipalities with swimming pools, especially to children over the age of four.*
- *Public awareness campaigns that encourage adults to remove children's access to or to empty all containers, especially five gallon buckets, that may have water in them.*
- *Water safety campaigns and boater safety classes that emphasize the proper use of PFDs.*
- *Distribution by marinas and boating dealers of PFDs with the sale of any boat or major boating accessory.*

Five Michigan Children who Died in 1999

- **A 16-year-old female was in a small boat with a group of friends. The boat capsized and the occupants were thrown into the water. There were life jackets in the boat, but the victim was not wearing one. Other passengers tried to save her, but they could not find her. The victim was reported as being a poor swimmer.**
- **A two-year-old girl wandered outside of the backyard fence at her daycare center. There was a pond outside of the fence, the gate to which is usually locked. It is not known if the child passed by an unlocked gate or crawled under the fence. The child was found floating face down in the pond.**
- **A five-year-old boy was fishing in a river with his family, wading in knee-deep water. He lost his balance and the current pulled him under. Efforts to save him failed because his family members were unable to swim. The area of the river is a popular fishing spot and part of a recreation area. No signs were posted warning of the strong current.**
- **A two-year-old boy climbed onto a chair and unlocked the back door so he could ride his toy car. He rode the toy car into the pool. A neighbor saw the child's sister running down the street looking for help. The neighbor pulled the boy from the pool and performed CPR but was unsuccessful. The children were supervised by a young babysitter who was sleeping at the time.**
- **The mother of a two-year-old boy had taken a bath in their Jacuzzi-style bathtub. She left the water in the tub for the boy's bath because the tub takes such a large amount of water to fill. The mother went out briefly to run errands, leaving the boy at home with the father. He was watching television when the child wandered into the bathroom, climbed into the tub and drowned.**

Figure 32. Michigan Unintentional Child Deaths Due to Drowning, Ages 0-18, 1989-1998



Includes ICD codes: E910.0-E910.9

Figure 33. Michigan Unintentional Child Deaths Due to Drowning by Age, Race and Sex, 1998

	WHITE		BLACK		OTHER		
Age	Male	Female	Male	Female	Male	Female	Total
<1	-	3	-	-	-	-	3
1-4	9	7	3	-	-	1	20
5-9	2	1	1	1	-	-	5
10-14	2	-	3	-	-	-	5
15-18	3	1	3	-	-	-	7
Total	16	12	10	1	-	1	40

Includes ICD Codes: E910.0-E910.9 N=40

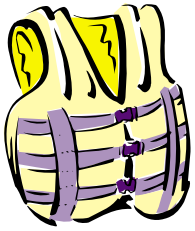
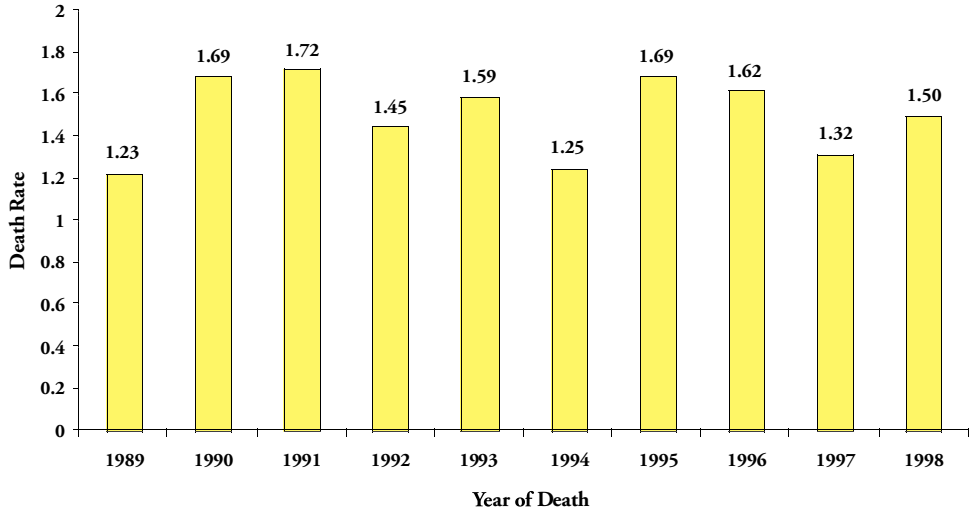


Figure 34. Michigan Unintentional Child Death Rates* Due to Drowning, Ages 0-18, 1989-1998



*per 100,000 of resident population in age group

Includes ICD codes: E910.0-E910.9

CHILD DEATH REVIEW FINDINGS IN 1999

The teams reviewed 34 drowning deaths in 1999. Half of the drownings occurred in lakes, rivers and other open bodies of water. Swimming pool drownings accounted for 38% of deaths reviewed by teams. Twenty children under age five were the victims of the drownings, and boys accounted for 23 of the 34 deaths.

Table 19
Drowning Deaths Reviewed by Age

Age	Number of Cases
< 1	2
1-4	18
5-9	3
10-14	8
15-18	3

Thirteen children drowned in swimming pools, but only one of their communities had a local ordinance requiring pool fencing.

The findings indicate that babies are most at risk for bathtub drownings, young children at highest risk of pool drownings and teens at highest risk of drowning in open bodies of water. Two of the three bathtub drownings involved children under one year of age. Ten of the 13 swimming pool drownings involved children ages 1-4. Eight of the 17 children who drowned in an open body of water were ages 11 and up.

Of the 13 deaths that occurred in swimming pools, in only one case did the team indicate that there was a local pool-fencing ordinance in place. In eight of the same 13 deaths, the child was "playing" at the time of drowning. Over half of the pool drownings occurred at the child's home or at another home. Two of the deaths occurred in licensed daycare homes. In none of the pool drowning cases reviewed did the teams report that there was adequate supervision by the caregiver. In eight of the 13 pool deaths, the child entered a gate while unattended, and six of these gates were not locked.

Only three of the 17 children who died in open bodies of water knew how to swim. No child was identified as wearing a PFD.

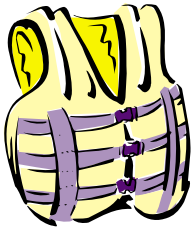
Seventeen cases were reviewed in which the child died in an open body of water (lake, river, etc.). Of those cases, eight children were said to be swimming at the time of the incident, but only three of these children knew how to swim. Of these 17 cases, only four had what the team considered adequate supervision at the time of the drowning. In several of the cases, the children were swimming or playing in water that had known hazards, including drop-offs and strong currents. There were no warning signs placed in these areas.

In the cases reviewed, no child was identified as wearing a PFD, but this information was missing in one case. One child drowned while boating and was not wearing a PFD.

Although alcohol use by persons supervising children and by teens swimming is significantly related to drowning, the findings from cases reviewed by teams in Michigan did not have this association.

COMMUNITY ACTIONS RESULTING FROM THE REVIEWS

- ***One team worked with a power company that owned river land. The property was a popular fishing and swimming area and had a boat launch on it. The company posted signs warning of strong currents.***
- ***A team successfully advocated to have signs placed in a recreation area, warning of strong river currents.***
- ***A brochure about drowning incidents and children was created and distributed by a team for a water safety education campaign.***
- ***A press release and press conference was held about water safety in one community. The team also worked with an organization that donated money to provide children's swimming lessons.***
- ***A special meeting was held with the county prosecutor regarding the laws as they pertain to child neglect and accidental lack of supervision that can result in the drowning deaths of children.***



- *A public service campaign was instituted on local radio stations regarding water safety tips, as well as participation on radio talk shows to discuss the importance of water safety for individual families as well as the good of the community.*
- *A local newspaper included water safety tips for pools and ponds and sponsored a parent's informational forum to address issues of child safety.*
- *One community initiated a program to distribute free pool alarms to swimming pool owners.*

Recommendations for State Policy Makers

28. Support public education and awareness campaigns on water safety with a special emphasis on the need for constant adult supervision and a focus on pools and bathtubs.
29. Encourage communities to create local ordinances to enforce the Michigan Building Code regarding pool fencing and pond enclosures in all jurisdictions throughout the state.
30. Encourage schools to seek ways to include swimming lessons and water safety classes for all students through curricula or linkages with other community groups.
31. Encourage local efforts to require signage at designated public swimming areas and waterways indicating possible dangers/hazards such as drop-offs and strong currents in open bodies of water.
32. Review current daycare licensing standards regarding compliance for water hazards in licensed centers/homes.

"Our CDR team felt that it was part of our duty to address the inordinate number of child drownings in our community. We put together a program to address the risk factors, used the local media and involved civic groups in the community who funded swimming lessons and educational materials to raise awareness."

Jeffrey Middleton
Prosecutor
St. Joseph County

SUFFOCATION

The Consumer Product Safety Commission believes that more than 900 infants suffocate each year because of unsafe sleep environments.

OVERVIEW

Child deaths due to suffocation result when the child is in a place or position where he or she is unable to breathe. (Suicide deaths by hanging are described in a later section of this report.) Unintentional suffocations include deaths caused:

- **By objects that cover a child's face, such as plastic bags or heavy bedding.**
- **When a child becomes wedged or entrapped into a small space, such as between a mattress and a wall, usually while in a sleeping environment. This is called positional asphyxia.**
- **By a person that unintentionally overlays on, or entraps and smothers a child.**
- **By a child choking on a foreign object.**
- **When a child is confined in an airtight place such as an unused refrigerator or toy chest.**

Most suffocations are unintentional and happen most frequently to infants and toddlers in a sleeping environment. Most infants who suffocate in this manner have no clinical findings at autopsy. It is only through a thorough scene investigation that these deaths can be distinguished from SIDS or intentional suffocation. *(See the section on SIDS.)*

Infants' faces can be covered during sleep if the babies fall into, or are covered by, objects such as heavy blankets or large stuffed animals. Some infants die when they roll onto items left near their sleeping area, including plastic bags, clothing and adult bedding.

Positional asphyxia deaths occur when infants' faces become pressed into soft mattresses, waterbeds or soft bedding; or when they become wedged into the edges of cribs with loose fitting mattresses, cribs with wide slats or between couch cushions. It is widely believed that couches and waterbeds pose the greatest danger for positional asphyxia.

Infants are at risk of an overlay death when sleeping with another person, especially when the person is obese and/or is alcohol or drug-impaired. At present, a national debate is occurring comparing the risks and benefits of bed-sharing (having the infant in the bed or on the same sleep surface as the caregivers). A number of studies have demonstrated that bed-sharing environments are hazardous for infants, even when the adults are not obese or alcohol/drug-impaired. Advocates of bed-sharing argue that the bed-sharing environment is conducive to infant-parent bonding and promotes breastfeeding.

A study conducted in Saginaw, Michigan, by researchers at Michigan State University, examined 22 infant suffocation deaths from 1993-1999, in which the infant was bed-sharing, representing 12% of Saginaw County's child deaths. In 80% of the cases, at least two other persons were in the bed with the infant. Alcohol or other drugs were not a factor in at least 50% of the deaths, and 42% of the infants were sleeping with normal weight adults as opposed to 47% of the infants that were sleeping with obese adults.

Also described in the section on SIDS, a study found that more than 75% of 119 Missouri infants that died from SIDS, suffocation or undetermined causes were sleeping on surfaces not designed for infants. This included adult beds, couches and chairs. Forty-seven percent were bed-sharing, and 23.2% showed evidence of entrapment. In 33% of the bed-sharing deaths, the infants were found on pillows and comforters. Only 8.4% of the 119 babies were sleeping on their backs, alone, with their faces uncovered.

The CPSC, after reviewing a number of national studies related to sleep environment, concluded that as many as 900 infant deaths a year are associated with soft bedding, including situations when the infant was bed-sharing

with adults. This led to a Consumer Product Safety Alert, issued in conjunction with the American Academy of Pediatrics and the National Institutes of Child Health and Human Development. The alert issued revised recommendations for safe sleep environments for infants to reduce the risks for suffocation and SIDS.

Though rare, there are well-publicized cases of parents intentionally smothering their children. Many of these deaths occur after the infant has already experienced a series of apparent life threatening events such as breathing difficulties and apnea episodes. A number of these deaths can be attributed to Munchausen's Syndrome by Proxy, in which the parent is seeking attention by creating a fictitious illness in the child. It is only through a thorough scene investigation and review of medical histories that these deaths can be distinguished from other suffocation deaths or SIDS.

MAJOR RISK FACTORS

- ***Infants that sleep on couches, waterbeds, soft mattresses, on soft bedding products or in cluttered sleep areas.***
- ***Bed-sharing caregivers who are fatigued, overweight and/or alcohol or drug-impaired pose greater risk of suffocating an infant.***
- ***Infants who sleep in the same bed with others (bed-sharing), including parents or other children.***
- ***Infants living in smoke-filled environments are more susceptible to suffocation with other risk factors present.***
- ***Easy access to small objects to children under age four poses choking risks.***

PREVENTION STRATEGIES THAT WORK

- ***The "Back to Sleep" Campaign, to reduce risks of SIDS, is promoting safe sleep environments for all children and has been highly successful.***
- ***The CPSC is working with major manufacturers of children's bedding products to promote safe sleep equipment and bedding. New initiatives were implemented in stores in the Fall of 2000, encouraging use of the CPSC guidelines for safe sleep.***
- ***Product safety actions to eliminate window blind cords, drawstrings on children's clothes and other objects that strangle or suffocate children have been highly successful.***
- ***Health professional guidance to new parents during birth preparation classes in hospital postnatal education sessions and as a part of well childcare is effective in encouraging safe sleep.***

A new study of 119 infant deaths from SIDS, suffocation and undetermined causes found that more than 75% were sleeping on surfaces not designed for infants.

THE CPSC RECOMMENDATIONS FOR SAFE BEDDING PRACTICES ARE:

- **Place the baby on his/her back on a firm, tight-fitting mattress in a crib that meets current safety standards.**
- **Remove pillows, quilts, comforters, sheep-skins, stuffed toys and other soft products from the crib.**
- **Consider using a sleeper or other sleep clothing as an alternative to blankets, with no other covering.**
- **If using a blanket, put the baby with feet at the foot of the crib. Tuck a thin blanket around the crib mattress, reaching only as far as the baby's chest.**
- **Make sure the baby's head remains uncovered during sleep.**
- **Do not place the baby on a waterbed, sofa, soft mattress, pillow or other soft surface to sleep.**

Six Michigan Children who Died in 1999

- **A six-month-old baby girl was put to sleep in her playpen. She was wrapped in a light blanket and put to sleep face down on an egg foam mattress. The playpen had nine stuffed animals, nine blankets and other toys in it. Her mother found the baby lifeless an hour after putting her to sleep.**

- **A one-month-old baby awoke in the middle of the night in his own bed. He was carried to his mother's bed so that she could breastfeed him. The mother fell asleep while breastfeeding the baby, then rolled over on top of him. The mother had been awake for much of the night and was very tired. The mom was of normal weight.**

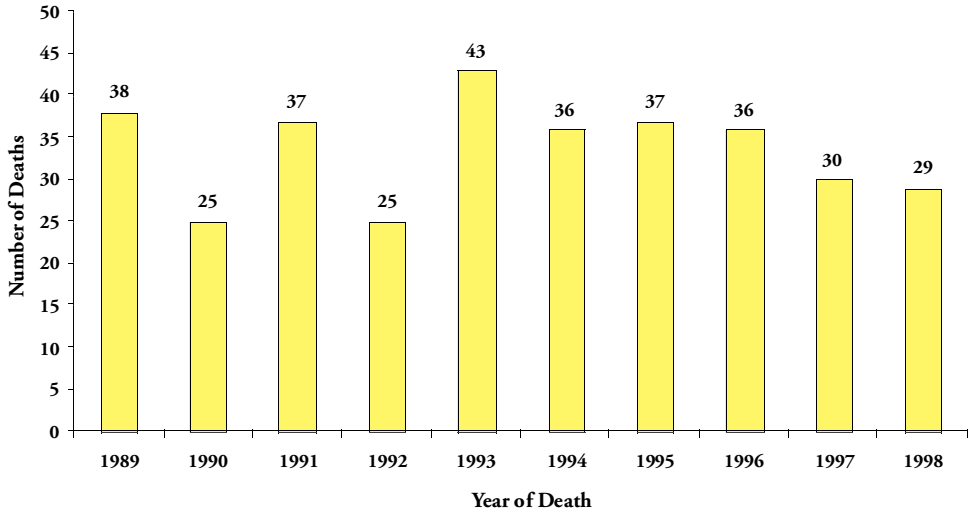
- **A one-month-old baby was put to sleep for a nap on his parent's waterbed, face down. When his mother came to check on him after an hour, he was not breathing and died later that afternoon.**

- **A father came home from a party, at which he had been drinking heavily, and lay on the couch with his sleeping baby. He rolled over onto the baby and did not wake up until late the next morning. The baby was not breathing and is believed to have died several hours earlier.**

- **A four-month-old baby girl was put to sleep on a twin mattress, on the floor, with her two older siblings. The baby fell between the mattress and the wall. Her siblings found her the next morning.**

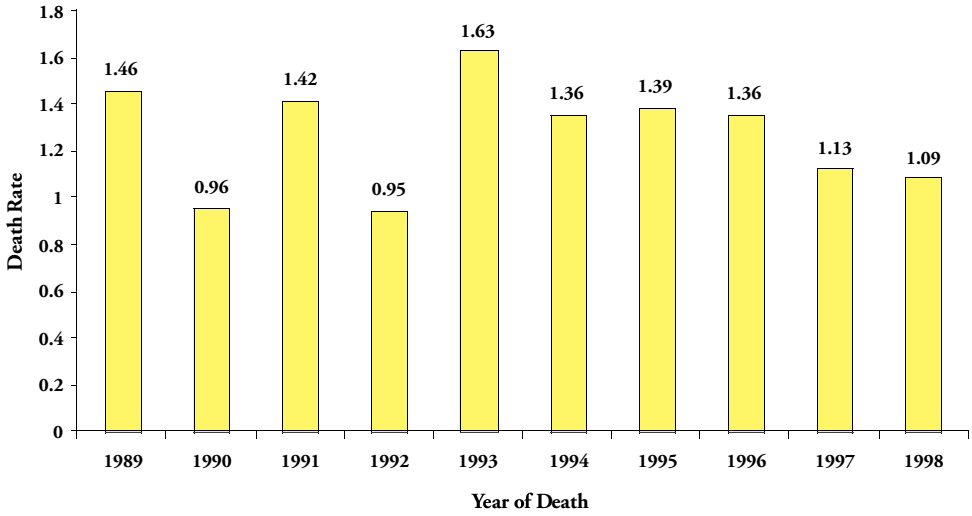
- **A father placed his seven-month-old infant in a car seat. He then placed over nine pounds of blankets and pillows on top of the baby, who suffocated while sleeping. The father was arrested for voluntary manslaughter.**

Figure 35. Michigan Unintentional Child Deaths Due to Suffocation, Ages 0-18, 1989-1998



Includes ICD codes: E911-E9115

Figure 36. Michigan Unintentional Child Death Rates* Due to Suffocation, Ages 0-18, 1989-1998



*per 100,000 of resident population in age group

Includes ICD codes: E911-E9115

Figure 37. Michigan Unintentional Child Deaths Due to Suffocation by Age, Race and Sex, 1998

	WHITE		BLACK		OTHER		
Age	Male	Female	Male	Female	Male	Female	Total
<1	6	3	5	2	-	-	16
1-4	1	-	2	-	-	1	4
5-9	-	1	-	-	-	-	1
10-14	3	-	1	-	-	-	4
15-18	3	1	-	-	-	-	4
Total	13	5	8	2	-	1	29

Includes ICD Codes: E911-E915 N=29

CHILD DEATH REVIEW FINDINGS IN 1999

The teams reviewed eight deaths in 1999 in which adults unintentionally smothered their infants while sleeping with them.

The teams reviewed 16 unintentional suffocations of children, four homicides and six undetermined suffocations. The types of deaths included:

- **Choking: One child choked on a plastic ball and one choked on food.**
- **Bedding: One child rolled into a plastic bag while sleeping, and five children suffocated while sleeping in heavy bedding, most often blankets and water beds.**
- **Overlay: Eight children were overlaid while sleeping by their caregiver (including one held in the arms while nursing).**

In six of the deaths reviewed, the medical examiners were unsure what caused the death and whether they were intentional or unintentional. Thus these deaths were listed as suffocation by undetermined cause. Sixteen of the 26 suffocation deaths were to infants less than one year of age.

Alcohol was believed to be a factor in two of the overlay deaths. In both of these cases, CPS substantiated charges on the caregivers that were intoxicated at the time they went to sleep with the infant. In two deaths related to bedding, teams believed product safety was a factor.

Family income was listed as low in four of the unintentional suffocation deaths. Teams believed families' inability to obtain or provide safe bedding was a factor in these deaths.

COMMUNITY ACTIONS RESULTING FROM THE REVIEWS

- *Several communities improved investigations and provided training to death investigators to better differentiate between suffocation and SIDS.*
- *Newspaper articles were written by team members addressing the dangers of unsafe sleep environments and the hazards of bed-sharing with infants.*
- *Communities developed loan-a-crib programs and parent education to ensure safe sleeping environments for children. One community has loaned out more than 300 cribs.*
- *One community advocated with state daycare licensing officials to encourage that the quality of the sleep environment is assessed during the licensing of centers.*
- *A number of communities developed education materials and training for health professionals, especially physicians, nurses and birth educators on safe sleep environments.*

"Because of our review meeting, we found that a baby had an unsafe crib. A new crib was placed in the home. We believe a second tragedy for this family was prevented."

Jim Martin
EMS/ME Office
Mecosta County

Recommendations for State Policy Makers

Note: These recommendations are the same as those for SIDS

10. **Require the use of existing protocols for the investigation of all sudden and unexpected child deaths (including autopsy, scene investigation and review of medical history) modeled after the *State of Michigan Protocols to Determine Cause and Manner of Sudden and Unexplained Child Deaths.***
11. **Study the merits of mandating autopsies for all sudden and unexplained child deaths.**
12. **Offer and encourage training for medical examiners and law enforcement personnel in the thorough investigation of child deaths.**
13. **Institute a practice in the Division for Vital Records and Health Statistics (DVRHS) of notifying the appropriate local medical examiner whenever a death certificate is received which shows SIDS as the cause of death, but for which no autopsy was done, and/or the medical examiner had not been involved with the case. DVRHS should encourage a comparable practice with offices of county and city registrars.**
14. **Build upon the success of the statewide "Back to Sleep" campaign to emphasize safe infant sleeping environments following the recommendations of the Consumer Product Safety Commission, and include a special focus on babysitters and childcare providers.**
15. **Incorporate SIDS risk reduction and safe infant sleep materials in Michigan's state-wide prenatal smoking cessation programs.**
16. **Encourage all health care professionals to reinforce the "Back to Sleep" message with parents and caregivers at every opportunity for contact.**
17. **Provide and reinforce safe infant sleep messages to all parents and caregivers.**

OTHER UNINTENTIONAL INJURY

Poisonings are the most common form of other injuries. Accidental ingestion of medication is the most common cause.

OVERVIEW

Other unintentional injury deaths include poisonings, falls, electrocutions, agricultural machine injuries, cutting instruments, animal attacks, undetermined and other deaths.

Unintentional injuries in children are often related to lack of adequate supervision. Poisoning deaths are usually caused by inattention of a parent or other caregiver. More than 90% of all poisonings occur in the home. Medication overdose, children ingesting household poisons and carbon monoxide poisoning are the leading causes of poisoning deaths for younger children. Adolescents are at risk for alcohol poisoning. In a study published by the Journal of American College Health, over 40% of students surveyed engage in binge drinking, which is defined as five or more drinks on one occasion.

Deaths caused by falls are generally rare for children. Falls are, however, a very common form of injury for children. The death rate for falls has declined for children ages 14 and under by 33% from 1987 to 1997. It is widely believed that the rate has dropped in part because of better understanding of the severe injuries related to abusive head trauma, which are often reported by perpetrators as due to accidental falls and are now more often correctly diagnosed as child abuse deaths.

Electrocutions occur from two primary sources, within the home and outdoors. Indoors, children are at risk for electrocution from exposed outlets, faulty appliances and incidents in the bathtub. Downed power lines and lightning strikes most often cause outdoor electrocutions.

MAJOR RISK FACTORS

- ***Inadequate supervision.***
- ***Males are at significantly higher risk for most types of injuries.***
- ***Unsafe environments for children.***
- ***Lack of secure storage for hazardous materials.***
- ***Unsafe products.***

PREVENTION STRATEGIES THAT WORK

- ***Alcohol education programs on campus, including programs that educate on the hazards of binge drinking.***
- ***Public education about carbon monoxide detectors and the marketing of dual carbon monoxide/smoke detectors.***
- ***Parent education about baby-proofing living areas.***
- ***State and federal efforts related to unsafe products, including recalls and public education campaigns.***

Four Michigan Children who Died in 1999

- A 13-month-old boy had a fever for three days. The pediatrician told his mother to give the recommended dose of Tylenol. To help with the fever, the mother decided to give the child Advil at the same time as the Tylenol, even though the dosage instructions are different for each medication. The child died of an overdose.

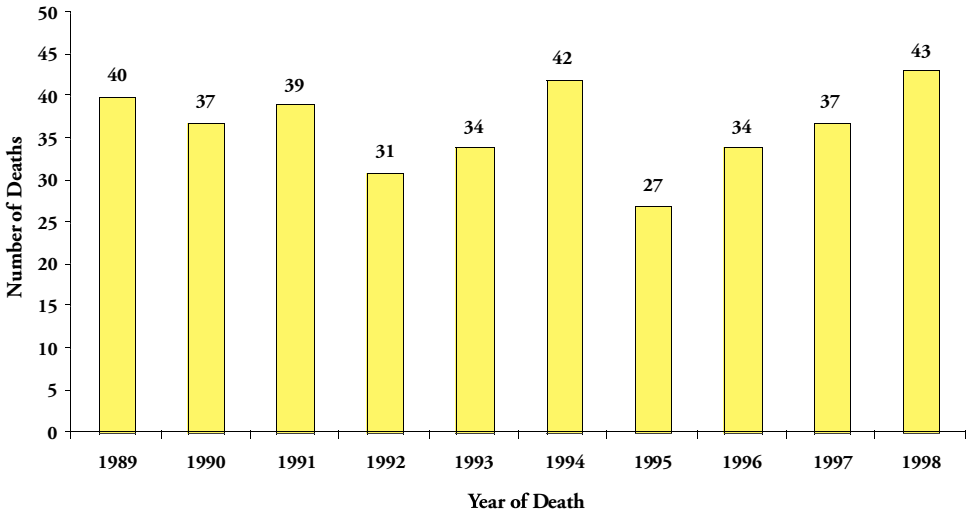
- A 10-year-old girl was swimming near a floating aluminum raft at a public lake as a storm was approaching. She was there with her father and her two brothers. As the girl climbed onto the raft, it was struck by lightning. The girl's two brothers felt the electricity in the water and quickly swam to the beach. Her father, who was on shore during the lightning strike, found the girl in four feet of water.

- An 18-year-old girl celebrated her birthday with friends by drinking 18 shots of hard liquor. The girl's friends put her to bed in her dorm room at 2:00 a.m. When they checked on her at 9:00 a.m., they found her lifeless.

- A toddler was playing in his front yard with a new puppy. The father went into the house for a few minutes. The boy then wandered into the backyard near the family's wolf-dog hybrid that was chained up. The boy was found lying on the ground within reach of the wolf-dog. He died of puncture wounds to the neck.

MICHIGAN MORTALITY DATA: 1989-1998

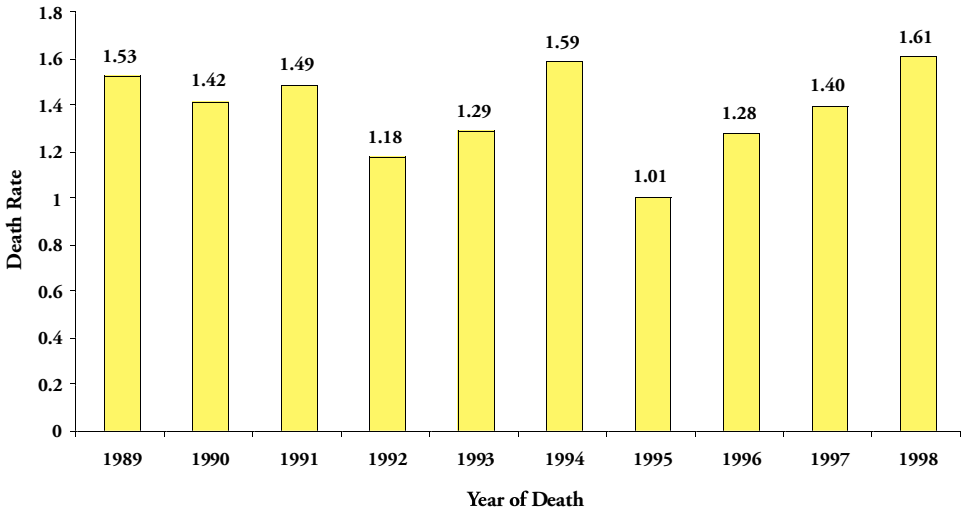
Figure 38. Michigan Unintentional Child Deaths Due to Other Injuries*, Ages 0-18, 1989-1998



*Other injuries include poisonings, falls, agricultural machine injuries, cutting instruments, electrocutions and others.

Includes ICD codes: E850.0-E876.9, E878.0-E888.9,E900.0-E9099, E916-E920.9, E921.0-E921.9, and E923.0-E9499

Figure 39. Michigan Unintentional Child Death Rates* Due to Other Injuries, Ages 0-18, 1989-1998**



*per 100,000 of resident population in age group

**Other injuries include poisonings, falls, agricultural machine injuries, cutting instruments, electrocutions and others.
Includes ICD codes: E850.0-E876.9, E878.0-E888.9,E900.0-E9099, E916-E920.9, E921.0-E921.9, and E923.0-E9499

Figure 40. Michigan Unintentional Child Deaths Due to Other Injuries* by Age, Race and Sex, 1998

	WHITE		BLACK		OTHER		
Age	Male	Female	Male	Female	Male	Female	Total
<1	2	3	2	-	-	-	7
1-4	3	1	1	1	-	1	7
5-9	6	3	1	-	-	-	10
10-14	4	2	2	-	-	-	8
15-18	7	3	-	1	-	-	11
Total	22	12	6	2	-	1	43

*Other injuries include poisonings, falls, agricultural machine injuries, cutting instruments, electrocutions and others.
Includes ICD codes: E850.0-E876.9, E878.0-E888.9, E900.0-E909.9, E916-E920.9, E921.0-E921.9, and E923.0-E949.9

CHILD DEATH REVIEW FINDINGS IN 1999

The teams reviewed 37 deaths due to other unintentional injuries in 1999. They included poisonings, falls, electrocutions, a scalding, a farm machinery incident, a wolf-dog attack, an accidental blunt force injury to the head and an accidental choking. Consistent with national data, boys were most often the victims.

Table 20
Child Unintentional Injury Deaths Reviewed by Cause

Unintentional Cause	Number of Cases
Poisoning	9
Falls	1
Electrocution	2
Other	24

The teams reviewed two times more unintentional injury deaths to boys than to girls.

Table 21
Child Unintentional Injury Deaths Reviewed by Age and Sex

Age	Male	Female	Total
< 1	9	8	17
1-4	2	1	3
5-9	2	0	2
10-14	4	1	5
15-19	7	2	9

Poisonings accounted for 25% of the deaths reviewed, although there was no specific pattern to the types of poisonings reviewed. Poisoning deaths were due to the following:

- **Prescription medicine overdose.**
- **Over-the-counter medicine overdose.**
- **Chemical poisoning.**
- **Carbon monoxide poisoning and other type of poison.**
- **Alcohol poisoning.**

Inadequate supervision was a significant factor in 25% of all cases reviewed. Fifty-nine percent of deaths were identified as "definitely" or "probably" preventable. Behavioral issues were identified as the primary risk factor in 65% of the cases.

COMMUNITY ACTIONS RESULTING FROM THE REVIEWS

- ***One community created a planning group made up of students to address alcohol use on campus.***
- ***A local community group was created to address poisonings.***
- ***An article was published in one local paper regarding the hazards that led to an accidental death.***
- ***One community studied the issue of wolf-hybrids by consulting with experts, and supported the legislative efforts to ban the breeding of these animals.***

"We reviewed two farm accidents. We obtained funds from our Family Services Network to purchase farm safety coloring books for distribution at fairs and other events. Our local paper will continue this project into the future."

Trooper Rich Johnson
Michigan State Police
Branch County

Recommendations for State Policy Makers

33. Encourage education for parents, child care providers and children on the issues surrounding poison control, especially involving safe storage and dispensing of medications.

34. Encourage compliance through strict enforcement of laws pertaining to excessive alcohol consumption among teens, especially binge drinking.

FIREARM

OVERVIEW

Children are involved in 55% of all unintentional firearm deaths.

Firearms are involved in three major types of deaths to children:

- **Unintentional injuries caused when children hunt or play with guns.**
- **Teen homicides usually committed by other teens.**
- **Teen suicides (described in a later section).**

UNINTENTIONAL FIREARM DEATHS

Michigan has new laws requiring that trigger locks or other safety devices be included with the sale of firearms.

Unintentional injuries from firearms represent less than two percent of all firearm deaths in the U.S. But of this two percent, children and adolescents are involved in 55% of the deaths. The majority of the injuries occur to children playing with or showing the weapons to friends.

The easy availability of firearms is the number one risk factor for unintentional firearm deaths. Researchers have found that in 48% of shootings in the U.S., children gained access to guns that were loaded and not locked away. A Gallup study found that 46% of all U.S. households with children have guns and 25% have handguns, yet it is estimated that 25% of gun owners keep their guns unlocked and loaded. The 1992 Michigan Behavioral Risk Factor Survey of families found that 46.2% of the respondents reported that they had at least one gun in their home; 23.3% reported that at least some of their guns were unlocked and unloaded with ammunition also unlocked, and 6.6% reported that they kept their guns unlocked and loaded.

This past June, Governor Engler signed into law a bill that will help to limit children's access to and potential harm from firearms. Public Act 265 of 2000 stipulates that federally licensed firearm dealers shall not sell a firearm in Michigan unless:

- **The sale includes either a trigger lock or other device designed to disable and prevent the discharge of the firearm; or**
- **The sale includes a gun case or storage container that can be secured to prevent unauthorized access to the firearm; or**
- **The buyer has in possession at the time of sale a trigger lock or other device, gun case or other storage container for the gun they are purchasing.**

The new law also requires federally licensed firearm dealers to include with firearm sales free written information on the safe use and storage of firearms in the home environment. The dealer must also post a notice that states that a person "may be criminally and civilly liable for any harm caused by a person less than 18 years of age who lawfully gains unsupervised access to your firearm if unlawfully stored."

YOUTH HOMICIDES

Youth homicides represent the greatest proportion of all firearm deaths. Youth homicide rates involving firearms reached such high levels in the late 1980s that the United States Surgeon General declared teen gun violence to be an epidemic. The risk of dying by firearm more than doubled for teens between 1985 and 1994 in the United States. The number of teens killed by firearms has dropped by 35% in the past four years. Still, in 1998, the Youth Risk Behavior Surveillance Survey for the U.S. reported that almost one-fifth of the 10th and 12th graders reported that they had carried a firearm within the previous 30 days for self-defense or to settle disputes.

The recent increase in homicides committed by troubled suburban and rural youth against their peers in school or other public settings has increased awareness of youth violence and the use of guns. However, despite these highly publicized and tragic events, youth firearm violence has been and continues to

be more of a problem of our larger cities, especially among poor, African American males. Nationally, homicides are the number one cause of death for African American and Hispanic teens. African American teen males have a homicide rate approximately seven times higher than white teen males. Yet when socioeconomic status is held constant, differences in homicide rates by race are insignificant. Major contributing factors in addition to poverty include easy access to handguns, involvement in drug and gang activity, family disruption and school failure. These homicides usually occur in connection with an argument or dispute. They almost always are committed by casual acquaintances of the same gender, race and age, using inexpensive, easily acquired handguns.

There are a myriad of prevention strategies available to communities to reduce gun violence among youth. Many of these appear to make sense and are easy to implement. However, research indicates that preventing youth violence requires complex, long-term solutions. The research conducted at the National Center on Violence Prevention found that youth homicides are usually clustered in cities. It is estimated that 10% of the offenders commit 70% of the crime and 10% of a city's neighborhoods are responsible for 60% of the police calls. Prevention efforts seem to be most effective when they target this 10% of neighborhoods and youth.

Research supports the belief that the development of violent behavior often follows a life course beginning with poor birth outcomes and continuing to family violence, poor social skills, peer rejection, school failure, delinquency and gang activity and finally death. Thus violence prevention research has demonstrated that strategies are most effective when they identify high-risk children in their earliest years and intervene at multiple levels through collaborative community partnerships.

Because these youth are also more likely to be expelled from school for fighting, weapons, etc., studies also show that these youth need alternative opportunities if expelled to prevent further violent behavior.

MAJOR RISK FACTORS

- ***Easy availability of and access to firearms.***
- ***Youth living in neighborhoods with high rates of poverty, social isolation and family violence.***
- ***Youth active in drug and gang activity, with prior histories of early school failure, delinquency and violence.***
- ***Youth with little or no adult supervision.***

PREVENTION STRATEGIES THAT WORK

Unintentional Firearm Deaths

- ***Gun locks and gun safety education.***
- ***Community standards related to the prosecution of persons leaving guns easily accessible to children.***

Homicides by Firearms

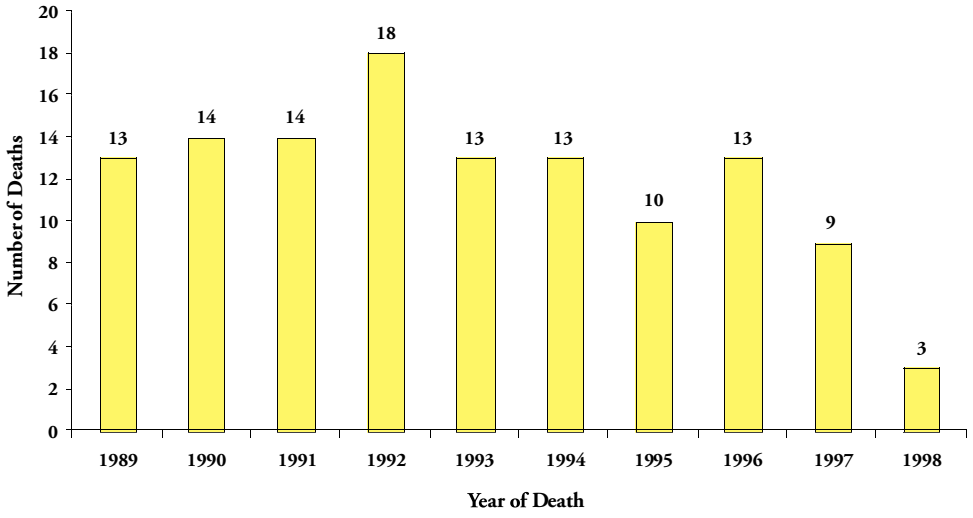
- ***Coordinated community partnerships focused on high-risk neighborhoods.***
- ***After-school mentoring and recreational opportunities.***
- ***Bullying prevention in early elementary grades.***
- ***Early identification, assessment and multi-systemic therapy for troubled youth.***
- ***Deterrence of illegal guns with police interdictions in community hot spots.***
- ***Intensive home-based services to high-risk new mothers.***

Firearm homicides continue to be the number one cause of death for African American male adolescents.

The most effective violence prevention programs focus on improving the life course for young high-risk children.

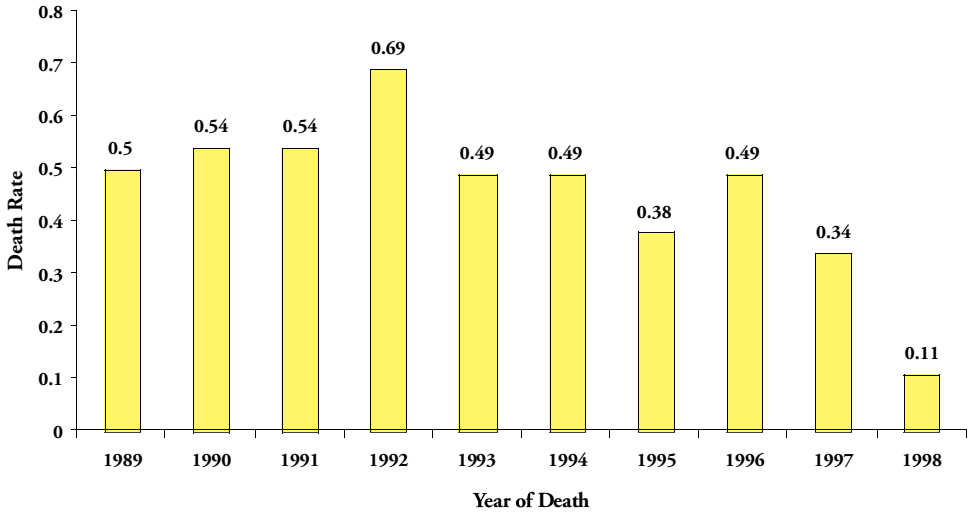
The rate of unintentional firearm deaths declined by 78% from 1996 to 1998 and by 68% from 1997 to 1998.

Figure 41. Michigan Unintentional Child Deaths Due to Firearms, Ages 0-18, 1989-1998



Includes ICD codes: E922.0-E922.9

Figure 42. Michigan Unintentional Child Death Rates* Due to Firearms, Ages 0-18, 1989-1998



*per 100,000 of resident population in age group

Includes ICD codes: E922.0-E922.9

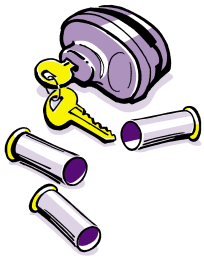
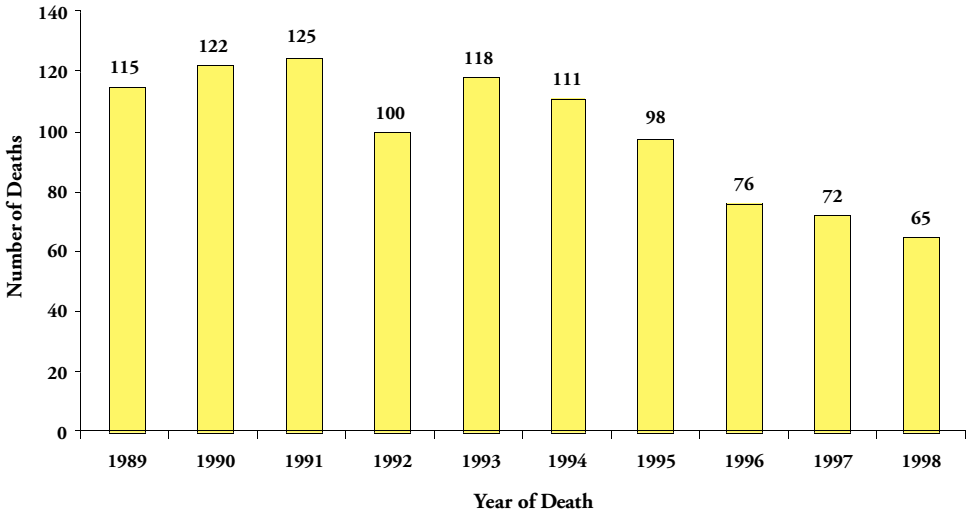


Figure 43. Michigan Unintentional Child Deaths Due to Firearms by Age, Race and Sex, 1998

Age	WHITE		BLACK		OTHER		Total
	Male	Female	Male	Female	Male	Female	
<1	-	-	-	-	-	-	-
1-4	-	-	-	-	-	-	-
5-9	-	-	-	-	-	-	-
10-14	2	-	1	-	-	-	3
15-18	-	-	-	-	-	-	-
Total	2	-	1	-	-	-	3

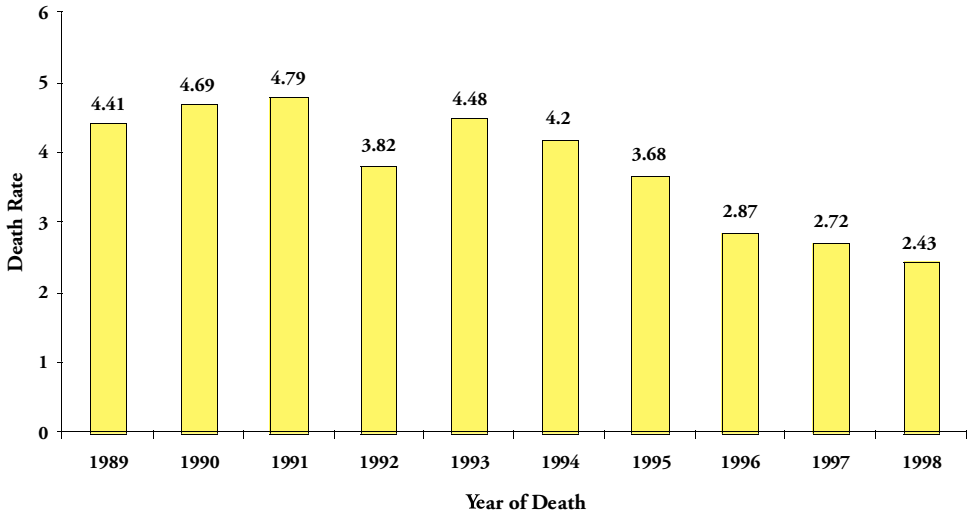
Includes ICD Codes: E922.0-E922.9

Figure 44. Michigan Child Homicides Due to Firearms, Ages 0-18, 1989-1998



Includes ICD codes: E965.0-E965.4

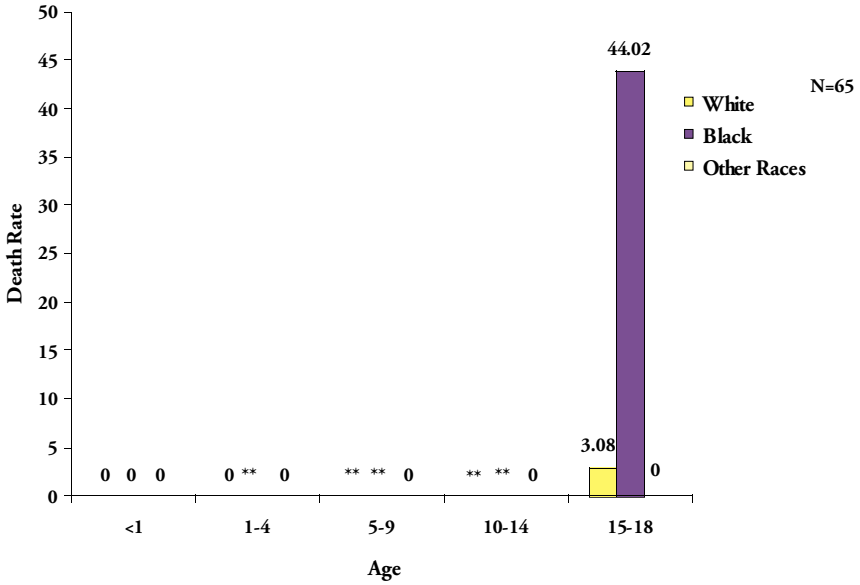
Figure 45. Michigan Child Homicide Rates* Due to Firearms, Ages 0-18, 1989-1998



*per 100,000 of resident population in age group

Includes ICD codes: E965.0-E965.4

Figure 46. Michigan Child Homicide Rates* Due to Firearms by Age and Race, 1998



*per 100,000 of resident population in age group

**Numbers are too small (<6) to calculate rate.

Includes ICD codes: E965.0-E965.4

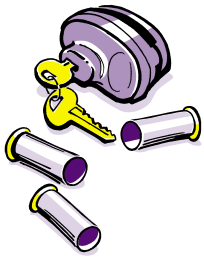
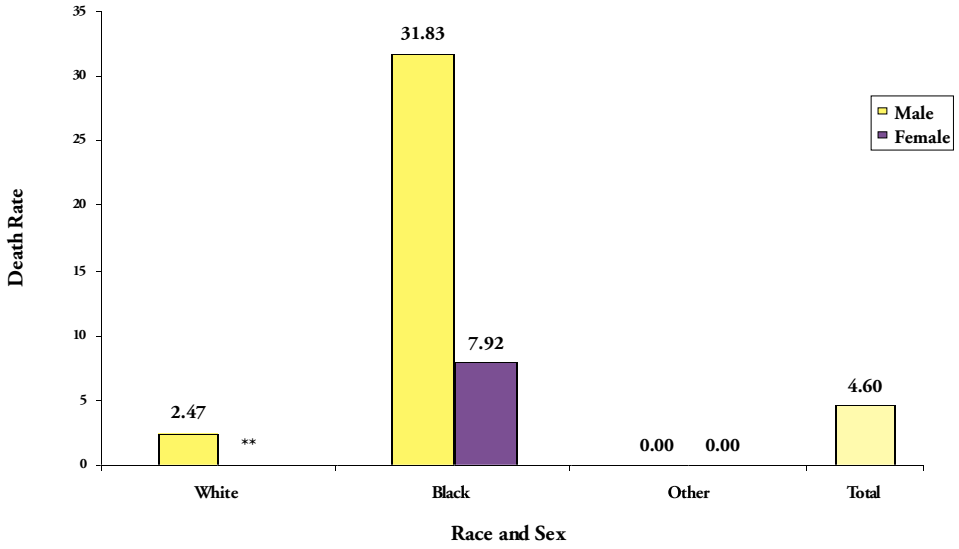


Figure 47. Michigan Child Homicide Rates* Due to Firearms by Race and Sex, Ages 10-18, 1998



*per 100,000 of resident population in age group

**Numbers are too small (<6) to calculate rate.

Three Michigan Children who Died in 1999

"Following a review of a death by gun violence, our team is pursuing initiatives to educate the larger community about firearm safety. This is crucial to educate and influence adult behaviors that expose children to violent situations."

Debbie Hagon
Health Department
Genesee County

- **A 15-year-old boy was showing his best friend his father's loaded gun. The gun unintentionally discharged, killing a younger brother. The boy had taken the gun from the unlocked gun cabinet.**
- **A 16-year-old boy had a long history with the courts and police. He was born into violence and in his short life was both a victim and an aggressor. He had been a victim of child abuse and lived with multiple foster families. He dropped out of school and was selling street drugs. An unknown assailant shot him during a drug deal.**
- **A 14-year-old boy had been suspended from school for numerous fights with his classmates. He had chronic absenteeism and had never done well in school. The teen lived with his maternal grandmother and was considered incorrigible. He had been in and out of numerous treatment programs and had many encounters with police for petty crime. He pulled a gun on a friend during an argument at a park and was then shot in the chest. The firearm used to kill him was an untraceable street gun.**

CHILD DEATH REVIEW FINDINGS IN 1999

Unintentional Firearm Deaths

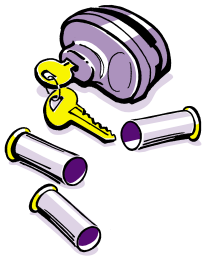
The teams reviewed two unintentional firearm deaths in 1999. The reviews found that in both cases the gun was not locked and was readily available. Neither youth had attended firearm classes and both were playing with the gun when it discharged. One teen was 17 and one was 15. The 15-year-old was using drugs at the time.

Homicides by Firearms

The teams reviewed 11 homicides by youth. (It should be noted that many of Michigan's youth homicides occur in the City of Detroit and the Wayne County review team did not focus their reviews on this type of death.) The teen was a random victim in only one of the cases reviewed. Five of the teens were shot by friends, two by acquaintances and three by a stranger. Drug dealing was involved in two of the deaths and gang activity in five of them. One teen died during an attempted robbery. Six deaths involved handguns. In six of the 11 cases, charges have been filed against the assailant.

COMMUNITY ACTIONS RESULTING FROM THE REVIEWS

- ***Several communities advocated with state legislators for laws to restrict gun sales and gun distribution.***
- ***One community encouraged their local HSCB to develop intensive community based programs for high-risk youth.***



Recommendations for State Policy Makers

35. Ensure enforcement of new legislation that requires licensed gun dealers to provide materials at the point of sale on gun safety and the proper storage of guns in homes with children.
36. Ensure enforcement of new legislation that requires firearms sold in Michigan by licensed dealers be provided with trigger locks or other comparable safety devices.
37. Encourage youth and parent gun safety education.
38. Evaluate current licensing procedures that enable a child to legally use a firearm without attending a gun safety class.
39. Support consequences against adults who furnish guns to minors for non-hunting purposes.
40. Support after-school and evening education and recreation programs for high-risk youth.
41. Support crisis team and victim advocacy to children who witness violence.
42. Encourage Human Service Collaborating Bodies to work with other local groups to strengthen or enhance innovative, intensive, community based violence prevention initiatives and programs that promote youth successes.
43. Encourage local educational alternatives and social support for students expelled from schools.

CHILD ABUSE AND NEGLECT

A myriad of reasons lead to the under-reporting of child abuse deaths. Child death reviews have helped to shed light on the reasons for this and have helped to identify abuse deaths disguised as other causes.

OVERVIEW

While total homicides in the United States continued to fall in the 1990s, the number of child abuse fatalities remained unchanged at about 1,100 child deaths in 1998. Most experts believe that the actual number of fatalities due to abuse and neglect is considerably higher. Estimates of the real number range from 2,000 to 5,000 deaths per year in the U.S.

A number of explanations have been offered for the discrepancies between reported cases and estimated actual cases. It is believed that many deaths are disguised, misdiagnosed or mislabeled as accidental or natural deaths. Many abuse and neglect deaths can only be diagnosed by thorough scene investigations and autopsies. Even then, findings may mimic other unintentional injuries or natural causes. As a society, it is difficult for anyone to believe that a person could deliberately kill a child through an abusive or neglectful action. There are usually no witnesses to an act that leads to a child abuse homicide. Because the perpetrators are usually parents or other caregivers, the first responders to a child death scene, medical personnel or investigators will often accept explanations given for the events that caused the death. Neglect deaths in particular are very difficult to identify because the neglect often results in illnesses and infections that can be attributed to natural causes.

Difficulties in accurate reporting are further complicated by the variations on the terminology used to describe fatal abuse and neglect. For example, fatal inflicted head trauma is also called inflicted cerebral trauma, abusive head trauma, shaken baby syndrome (SBS), shaken impact syndrome or abusive brain trauma.

There are many forms of physical abuse and neglect that can lead to death. Physical abuse is the infliction of injury by punching, beating, kicking, biting, burning, shaking or otherwise physically harming a child. The majority of children die from fatal inflicted head trauma. Their heads can be slammed against a surface, hit or severely shaken. The next most common forms of physical abuse deaths are caused by punches or kicks to the abdomen, intentional burns and poisonings. Many children who die from physical abuse have been abused over time, but a one-time event often causes a death.

Most children die from abuse when a caregiver loses patience with the child. The most common precipitating "triggers" are inconsolable crying, bedwetting, fussy eating and disobedient behavior.

Fatalities from neglect include a number of different types. Chronic neglect includes depriving a child of food, clean environments or safe shelter. Deaths can result from malnutrition, failure to thrive, illnesses and/or starvation. Medical neglect includes failure to seek medical care when a child is ill. Many neglect cases result from failure to adequately supervise a child, often for extended periods of time. Negligence on the part of a caretaker can lead to bathtub drownings, suffocations, falls, poisonings and other types of fatal "accidents."

Children under the age of five are the most frequent victims of child abuse fatalities, with 75% of those being three years of age or younger. National data finds that girls under the age of five are more at risk for physical abuse and boys are more at risk for neglect fatalities.

Fathers and other male caretakers are responsible for over three-quarters of fatal abuse, while mothers account for the majority of neglect. While no single profile fits every case, several factors seem to characterize many

child abusers. They are more likely to be a young adult in his or her mid-20's who:

- ***Lives near or below the poverty level.***
- ***Has not finished high school.***
- ***Is depressed or unable to cope with stress.***
- ***Was also a victim of child abuse.***
- ***Is a victim or perpetrator of domestic violence.***
- ***Has a problem with drugs or alcohol.***

Persons who neglect their children are more likely to be suffering from postpartum depression, substance abuse, domestic violence or mental illness.

A 1999 study by the National Center on Addiction and Substance Abuse found that children of substance-abusing parents were almost three times likelier to be abused and more than four times likelier to be neglected than children of parents who are not substance abusers. Other studies suggest that an estimated 50% to 80% of all child abuse cases substantiated by Child Protective Services involve some degree of substance abuse by the child's parents.

MAJOR RISK FACTORS

- ***Younger children, especially under the age of three.***
- ***Children with emotional and health problems.***
- ***Families living in poverty.***
- ***Parents who are young, poor, depressed and also victims of abuse.***
- ***Substance abuse (especially alcohol) among caregivers.***
- ***Children left with male caregivers who lack emotional attachment to the child.***
- ***Parents, caregivers and children who are socially isolated.***
- ***Parents and caregivers with unrealistic expectations of child development and behavior.***

PREVENTION STRATEGIES THAT WORK

- ***Support programs for high-risk parents, especially home visitation programs for young, new parents.***
- ***Parent education programs that model behavior and provide support services to high-risk families.***
- ***Early and regular child and family screening and treatment programs to detect possible abuse and neglect.***
- ***Childcare opportunities to provide regular or occasional out-of-home respite care.***
- ***Programs for abused children to minimize the long-term effects of the abuse.***
- ***Family support services to provide immediate assistance to parents in times of stress, including 24-hour telephone hot lines, crisis caretakers, nurseries and counseling.***
- ***Availability and accessibility of quality daycare programs for high-risk families.***
- ***Information and education campaigns to make the public aware of the forms of abuse and neglect.***
- ***Mandatory education and training on child abuse and neglect for health care professionals that work with children.***
- ***Efforts to ensure that mandatory reporters comply with existing child abuse reporting laws.***

Most children that are victims of fatal abuse die from head injuries when they are shaken, hit or thrown against a surface.

Five Michigan Children who Died in 1999

- **A three-year-old boy, one of five children living with his grandmother, complained of stomach pains and could not eat. The grandmother did not seek medical help for three days, fearing she would be accused of abuse. The child died two days after she finally took him to the doctor. She admitted to hitting him very hard by beating him on his back while he lay over her lap. She stated that this was the way she disciplines all of the children. The autopsy revealed starvation, multiple healing fractures and swollen and bruised internal organs. The grandmother was charged with second degree murder and the remaining children were placed in foster care.**

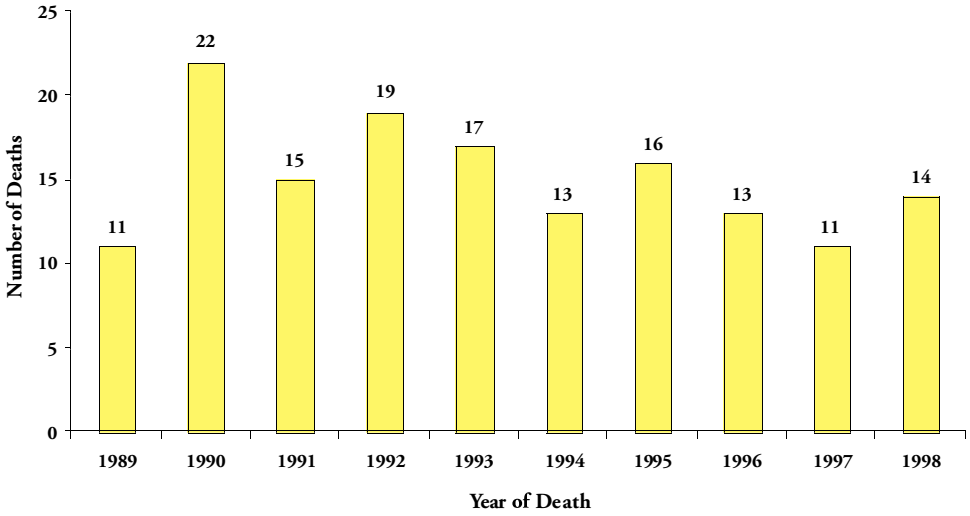
- **A teenage father was watching his three-month-old baby boy and his two-year-old daughter while the children's mother worked. The father barricaded the two-year-old in her room. He then placed the baby in a car seat and gave him a bottle propped up with a pillow. He placed the baby at the foot of his bed while the father slept from 7:00 a.m. until 1:30 p.m. Upon awakening, he found the baby dead, covered with the pillow and blankets in 85-degree heat. He was charged with manslaughter.**

- **A two-month-old baby girl suffocated due to wedging. Her 20-year-old mother was intoxicated and fell asleep while feeding the baby a bottle in a reclining chair. Her baby slid between her and the arm of the chair. The mother was charged with involuntary manslaughter and neglect.**

- **A six-month-old baby girl died from brain injuries. Her mother's boyfriend, who had a history of drug abuse, was caring for her while her mother worked. He admitted to shaking her hard and pushing her off the bed when she would not stop crying. He was convicted of manslaughter.**

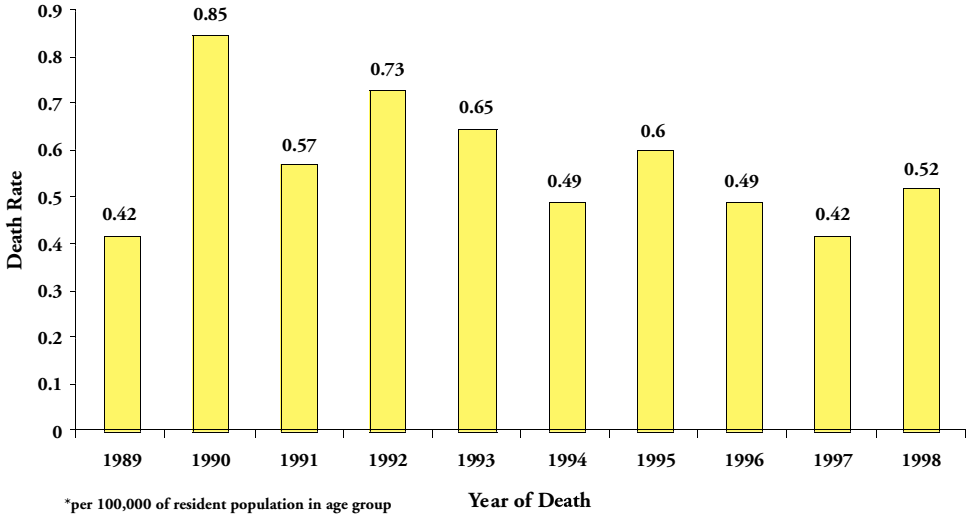
- **A one-month-old baby boy died from a viral infection. The death was reported as a natural death. Upon further review of the medical history, it was found that the child was born prematurely and had a low birth weight. The baby left the hospital with the mother with extensive instructions for follow-up medical care. The mother never returned for the scheduled medical visits and was feeding him watered down formula. He was brought to the ER with a high fever. He was not clean and was wrapped in a dirty blanket. The child died two days later in the hospital.**

Figure 48. Michigan Child Homicides Due to Abuse and Neglect, Ages 0-18, 1989-1998



Includes ICD codes: E967.0-E967.9

Figure 49. Michigan Child Homicide Rates* Due to Abuse and Neglect, Ages 0-18, 1989-1998



*per 100,000 of resident population in age group

Includes ICD codes: E967.0-E967.9

Figure 50. Michigan Child Homicides Due to Abuse and Neglect by Age, Race and Sex, 1998

Age	WHITE		BLACK		OTHER		Total
	Male	Female	Male	Female	Male	Female	
<1	2	1	4	3	-	-	10
1-4	2	-	1	-	-	-	3
5-9	1	-	-	-	-	-	1
10-14	-	-	-	-	-	-	-
15-18	-	-	-	-	-	-	-
Total	5	1	5	3	-	-	14

Includes ICD Codes: E967.0-E967.9 N=14

MDCH's Vital Statistics reported 14 child abuse homicides in 1998. A review of other state sources identified a total of 43 fatal abuse deaths for 1998.

As described in the introduction to this section, it is widely accepted that the actual number of child abuse and neglect deaths remains unknown and that the official counts are under-reported. To determine if this seems true for Michigan, three sources of data were used to identify the incidence of fatal abuse and neglect in Michigan in 1998, and then compared to CDR team findings from 1998.

- **MDCH's Vital Statistics**
- **The Michigan FIA Child Death Report**
- **MDCH's Death Transcripts from 1998**

Source	Number of Abuse Deaths	Number of Neglect Deaths
Vital Statistics	14	0
FIA Death Reports	19	12
Death Transcripts	6	0

A thorough review of the reports from these three sources indicated considerable discrepancies. There were eight deaths identified by both MDCH and FIA. Six deaths were not listed by either MDCH or FIA, but were identified as child abuse or neglect at child death review meetings, including several that were successfully prosecuted as homicides. Combining all sources, it was determined that there were 43 deaths in Michigan in 1998 due to child abuse and neglect.

The cause of death listed by each source of data included:

Cause of Death	Vital Stats	FIA	Vital Stats & FIA	Death Transcripts
Shaken Baby Syndrome	3	1	2	
Head Trauma	1	5	5	2
Multiple Internal Injuries	1	3	1	
Asphyxiation	1	4		1
Gunshot		3		1
Heat Exposure		2		
Drowning		1		1
Poisoning		1		
Malnutrition		2		1
Febrile Seizure		1		

When information was available, an unduplicated count from the three data sources found that:

- **There were 24 boy and 19 girl victims.**
- **Twenty of the victims were white and 23 were African American.**
- **Nineteen of the children were less than one year of age. Eighteen were between one and four years old. Six children were between five and 10 years old.**
- **Domestic violence was involved in at least three of the deaths.**
- **Twenty-one of the children had prior CPS histories in their families and nine had none.**
- **Of the perpetrators, seven were biological fathers, four were boyfriends, one was a foster father, one was a daycare licensee and four were biological mothers.**

CHILD DEATH REVIEW FINDINGS IN 1999

The information presented in this section refers only to the 21 cases of fatal child abuse reviewed by local teams in 1999.

Most of the deaths reviewed were beatings to young boys, and most resulted from SBS and other fatal head injuries. The deaths caused by inadequate supervision included one drowning and one fall from a window.

Boys were the victims in 71% of the cases reviewed by the teams, and most boys were beaten or shaken to death.

Table 22
Type of Fatal Abuse by Gender of Victim

Fatal Abuse Type	Male	Female	Unknown
Shaken Baby Syndrome	6	2	1
Beating	7	2	0
Inadequate Supervision	1	1	0
Intentional Scalding	1	0	0

Table 23
Child Abuse Deaths Reviewed by Age of Victim at Death

Age	Number of Cases
<1	7
1	5
2	4
3	3
4	1
5	1

77% of the abuse deaths reviewed were of children living in poverty.

Ten of the victims were white, 10 were African American and one was Asian. Of the 18 cases where socioeconomic status was noted, 14 children lived in low-income families, four were middle-income and none were high-income.

The suspected triggers for the abuse deaths included crying in nine of the cases, disobedience in three cases, one case of feeding difficulty, one incidence of toilet training difficulty, one case whereby the child was killed during a violent fight between the parents and three listed only as "other."

Six of the children had a record of prior abuse and were receiving services, while 13 had evidence of prior injuries. Only one family was known to have participated in family preservation services.

Table 24
Child Abuse Deaths Reviewed by Perpetrator

Perpetrator	Number of Cases
Mother's Boyfriend	8
Father	7
Step-Father	1
Foster Mother	1
Other	2
Unknown	2

Seven of the perpetrators were listed as having previously demonstrated behaviors predictable of violence, while nine had a history of domestic violence. Five perpetrators had made prior assaults on children, and 14 of the families involved had prior CPS complaints filed. Eighteen of the perpetrators of the fatal abuse were arrested and had charges filed against them. Two were still pending at the time of this writing and in one case, no arrest was made.

COMMUNITY ACTIONS RESULTING FROM THE REVIEWS

- *Communities targeted education to parents, caregivers and the general population via the media.*
- *An educational session was presented to emergency room staff on SBS and subsequently, revisions were made to the hospital's protocols for assessing child wellbeing in the emergency room.*
- *A number of local agencies implemented the Michigan Children's Trust Fund "Never Shake a Baby" Campaign.*
- *One county held a training on Shaken Baby Syndrome for over 300 local participants.*
- *A number of counties assessed their community standards and local practices related to investigating and providing services in cases of child abuse and neglect.*

At least 79% of the children were killed by their fathers or mothers' boyfriends, usually while the mothers were away.

Recommendations for State Policy Makers

44. **Ensure that the Family Independence Agency's Children's Protective Services worker training emphasizes assessment for medical neglect.**
45. **Assure that human service professionals working with high-risk families are knowledgeable about support programs and resources for new families, especially Maternal Support Services, Infant Support Services and other state and community-based primary and secondary prevention programs.**
46. **Educate and support the medical community in identifying child abuse and/or neglect.**
47. **Expand opportunities to provide intensive and effective home visiting services for high-risk families.**
48. **Encourage Human Service Collaborative Bodies to examine communication and coordination among public and private agencies, including those across county lines, when serious risk factors are known or identified.**

SUICIDE

OVERVIEW

Access to firearms is believed to be the major reason for the rapid increase in youth suicides over the past three decades.

The most recent national data from 1997 indicates that suicide was the third leading cause of death among young people 15-24 years of age. In 1997, 2,105 children committed suicide in the U.S. including 303 children ages 10-14 and 1,802 teens ages 15-19. Males are much more likely to successfully commit suicide than females (by a five to one ratio), but females make more suicide attempts. Suicide is still mostly a significant problem among white adolescents, but between 1980 and 1996, the rate of suicide among black males ages 15-19 years increased 105%. Almost 100% of the increase in this group was attributable to the use of firearms.

This past year, the U.S. Surgeon General issued a national call to action to prevent suicide.

The use of firearms is the most common method of suicide by youth. This holds true for males and females, younger and older adolescents and for all races. Guns in the home, particularly loaded guns, are associated with increased risk for suicide, both with and without identifiable mental health problems or suicidal risk factors. Public policy initiatives that restrict access to guns are associated with a reduction of firearm suicide and suicide overall, especially among youth.

Youth suicide is a complex, multi-dimensional issue that is difficult to understand. Many suicides are believed to be an interaction of one or more factors: substance abuse; impulsive, aggressive and antisocial behavior; family influences, including a history of violence and family disruption; severe stress in school or social life; mental illness and rapid sociocultural change. Many youth suicides occur when these risk factors are present, but follow a precipitating event, such as the ending of a relationship with a close friend, the failing of a major test in school, an arrest for a minor crime or a fight with a parent. Teens at high risk for suicide are especially vulnerable to a phenomenon unique to teens known as cluster suicides. Teens may enter into suicide pacts with their peers or attempt suicide following a suicide death of a peer.

There are a number of protective factors that can help prevent suicide. These include: effective clinical care; easy access to care; restricted access to highly lethal methods of suicide; family and community support; learned skills in problem solving and conflict resolution; support from ongoing medical and mental health care professionals and cultural beliefs that discourage suicide and support self-preservation instincts. Cluster suicides can be prevented by recognizing teens at risk, providing intensive services and surveillance of the teens and avoiding extensive media coverage of the first suicide.

In 1999, the Department of Health and Human Services issued a landmark report titled, *The Surgeon General's Call to Action to Prevent Suicide,* which lays out a plan for reducing suicide in the United States. The plan, known as A.I.M., describes three steps necessary to prevent suicides:

1) Awareness to promote the public's understanding of suicide and its risk factors.

2) Interventions that enhance services and programs.

3) Methodologies to advance the science of suicide prevention.

The Michigan Department of Community Health has organized a working group that hopes to build professional capacity across the state to emplement this plan for Michigan, with a focus on adolescents and the elderly.

MAJOR RISK FACTORS

- *A prior attempt.*
- *A pre-existing mental disorder, especially depression or bipolar disorder.*
- *Co-occurring mental illness and substance abuse.*
- *A family history of suicide.*
- *Loneliness, hopelessness and/or a previous significant loss.*
- *Impulsive, aggressive behaviors.*
- *Barriers to accessing mental health treatment.*
- *Long term illness.*
- *Easy access to lethal methods.*
- *Influence of significant people who have died from suicide.*
- *Religious or cultural beliefs.*
- *Recent suicide(s) by youth known to the child.*

PREVENTION STRATEGIES THAT WORK

- *School gatekeeper training that helps school staff identify and refer students at risk for suicide and teach staff how to respond to suicide or other crises in the school.*
- *Community gatekeeper training for community members (e.g., clergy, police, merchants, recreation staff and health-care providers) who interact frequently with teens.*
- *General suicide education targeted to teens to help them understand warning signs and supportive resources.*
- *Screening programs, including those in schools, to identify students with psychological problems or personality traits that could be related to suicide, depression and impulsive or aggressive behaviors.*
- *Peer support programs to foster positive peer relationships and competency in social skills among high-risk adolescents and young adults.*
- *Crisis centers and hotlines.*
- *Restriction of access to lethal means of suicide, especially for high-risk teens.*
- *Interventions after a suicide that focus on friends and relatives of persons who have committed suicide, to help prevent or contain suicide clusters and to help adolescents and young adults cope effectively with the feelings of loss that follow the sudden death or suicide of a peer.*

The Yellow Ribbon Suicide Prevention Campaign helps youth identify places to get help when they or their friends are troubled. It is a major effort in a number of Michigan communities.

Five Michigan Children who Died in 1999

- **Following a fight with his step-mom, triggered by a call home from his teacher to tell his parents that he had been disturbing other students at school, a 14-year-old male used a drill to get a 12-gauge shotgun out of the gun cabinet. He had been receiving mental health services because of domestic violence and had made prior verbal threats of suicide.**

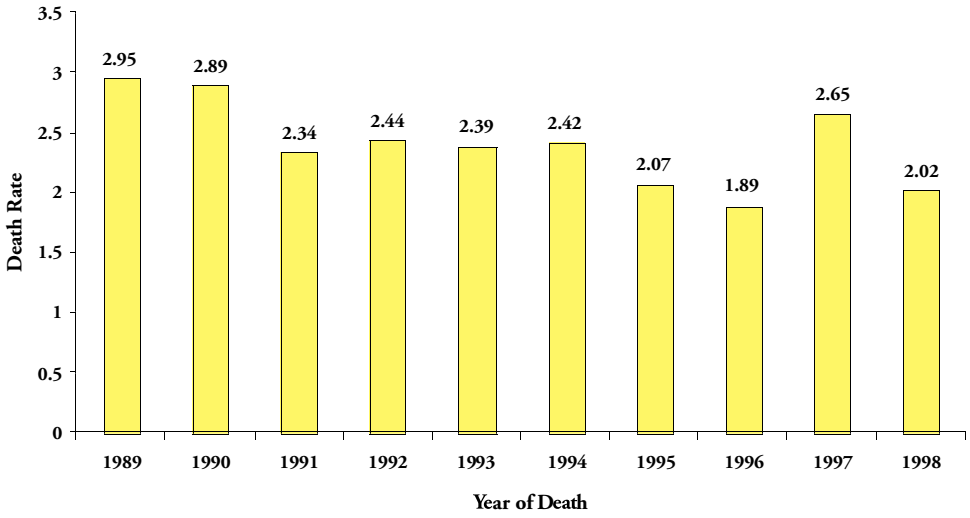
- **An 18-year-old girl killed herself one month after her best friend took her own life. She hung herself in a barn. Previously, she had made comments to other friends about killing herself in order to be with her best friend again.**

- **A mother and 12-year-old girl had an unusually angry argument. The mother left to run an errand and when she returned she found her daughter hanging in her bedroom. The death was completely unexpected. The girl had had no prior histories of depression or of suicide attempts, but was described as unhappy about her parents' recent marital difficulties.**

- **A 16-year-old male was facing jail time for breaking and entering. After the police questioned him, he went home and drank poison. He did not have a prior record. He'd been caught smoking marijuana a few weeks before by his father.**

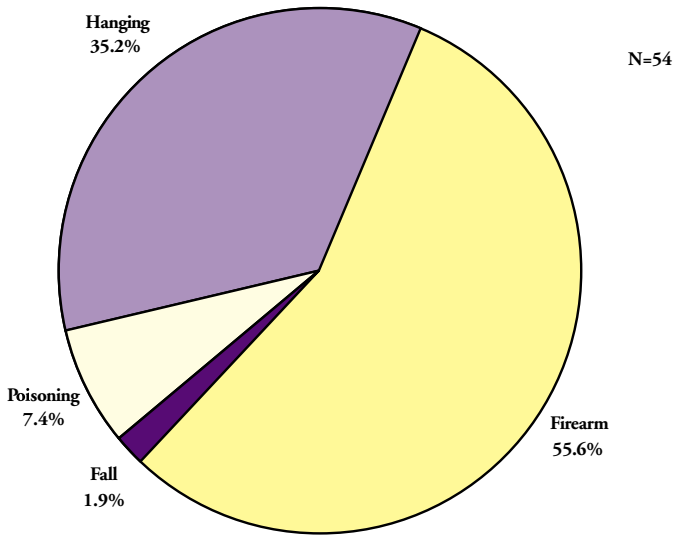
- **A 13-year-old male had made several comments to his friends that he was going to kill himself. No one alerted an adult to the situation. He stayed home sick from school and said he was going to take a nap in his parent's bedroom. Instead, he pulled the loaded gun out of the closet and fatally shot himself.**

Figure 51. Michigan Child Suicide Rates*, Ages 0-18, 1989-1998



*per 100,000 of resident population in age group

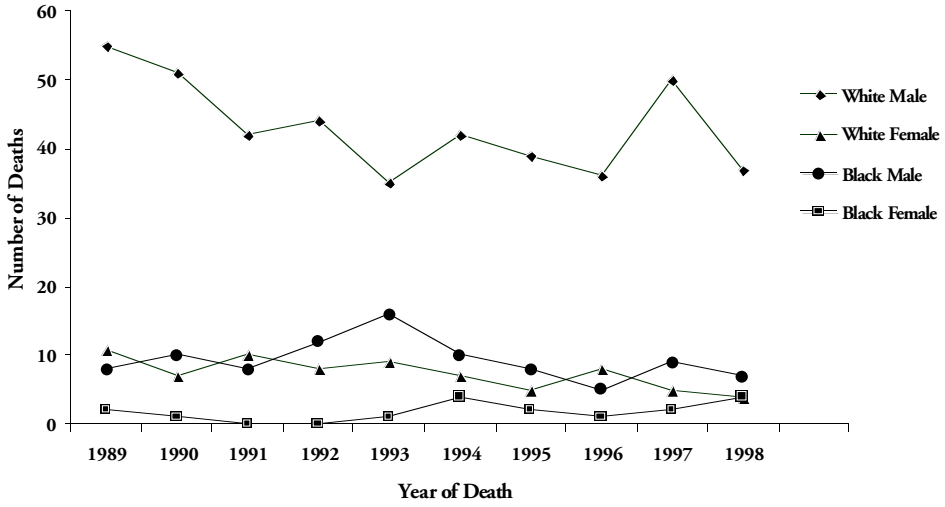
Figure 52. Michigan Child Suicides by Cause, 1998



Includes ICD codes: E950.0-E959.9

84% of the suicide victims were adolescent boys. National data finds that more girls attempt suicide but boys are more successful because they use firearms.

Figure 53. Michigan Child Deaths Due to Suicide by Race and Sex, Ages 0-18, 1989-1998



Includes ICD codes: E950.0 - E959.9

Figure 54. Michigan Child Suicide Rates* by Age, Race and Sex, 1998

	WHITE		BLACK		OTHER		
Age	Male	Female	Male	Female	Male	Female	Total
<1	-	-	-	-	-	-	-
1-4	-	-	-	-	-	-	-
5-9	-	-	-	-	-	-	-
10-14	2.4	**	**	**	**	-	1.8
15-18	12.9	**	**	**	**	-	7.4
Total	3.4	**	**	**	**	1	2.0

*per 100,000 of resident population in age group

N=54

** Numbers are too small (<6) to calculate rate.
Total death rates only include residents 10-18 years of age.
Includes ICD codes: E950.0-E959.9

CHILD DEATH REVIEW FINDINGS IN 1999

The teams reviewed 34 deaths to children due to suicide.

Table 25
Suicides Reviewed by Method

Method of Suicide	Number of Cases
Self-inflicted Gunshot	15
Asphyxia by Hanging	15
Poisoning	3
Train	1

Nine of the children were ages 10-14, and 23 were ages 15-18. Two suicide cases of 19-year-olds were reviewed. Twenty-seven of the victims were white, five were black and two were Native American. Thirty-two (or 84%) of the teens were boys. Of the 34 deaths, six of the teens were known to have had prior mental health problems. Five of the teens had made prior attempts, and eight teens had made verbal threats. In nine of the cases, the suicide was completely unexpected. Two of the cases were possible cluster suicides. Many cases identified a precipitating event. These included trouble with the law, failing grades and losing friends due to motor vehicle crashes, fires or suicides.

In eight of the cases, CPS had been involved, four with the child that died. In one of the cases, the child had been placed with a relative. The placement had seemed successful and the suicide was completely unexpected. One case had been referred to CPS because of alcohol abuse and domestic violence.

The local child death review teams concluded that 14 of the suicides were preventable. Two of the reports indicated that access to guns was a key factor in the deaths. In nine of the fifteen firearm suicides, the guns were not stored in a locked cabinet and were easily accessible.

"We reviewed several suicides of teenagers, representing an extremely high rate for Mason County. We recommended that our local collaborative body's leadership council find a way to assist schools and the community to handle such incidents. A protocol was developed with input from various agencies and presented to the schools to use as a model for crisis response."

Richard Trier
FIA
Mason County

COMMUNITY ACTIONS RESULTING FROM THE REVIEWS

- ***The Yellow Ribbon Campaign was organized and fundraisers held to support the campaign. It is being implemented across several counties to help raise awareness and provide education within the schools and the community on adolescent suicide.***
- ***Suicide task forces were created in communities and now involve local human service agencies in the design of crisis intervention programs and suicide prevention issues in the schools.***
- ***Several communities took extraordinary steps to identify other children at-risk and provided wrap-around services and close supervision to these children.***
- ***One local team sent letters and resource materials to school boards urging them to continue advocating for children by taking an active role in identifying high-risk children, facilitating on-site counseling opportunities and providing continuing education on suicide prevention for teachers and support staff.***

Recommendations for State Policy Makers

49. Support statewide efforts to examine all of the issues surrounding adolescent suicide and develop plans for prevention.
50. Institute training for all health, mental health, substance abuse and human service professionals (including teachers) concerning suicide risk assessment and awareness of referral resources.
51. Encourage the development and evaluation of new prevention technologies, especially firearm safety measures, to reduce easy access to lethal means of suicide.
52. Develop model bereavement, grief support and prevention programs for friends and families of suicide victims.

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Appendix B

List of Figures: Mortality Data from the Official Count of Child Deaths

Appendix C

List of Tables: Data from the Local Child Death Review Case Reports

Appendix D

Total Number of Cases Reviewed by County
1995-1999

County Name	Number of Cases Reviewed 1995-1997	Number of Cases Reviewed 1998	Number of Cases Reviewed 1999	Total Number of Cases Reviewed 1995-1999
Alcona	0	0	0	0
Alger	0	0	2	2
Allegan	0	7	18	25
Alpena	0	0	0	0
Antrim	0	0	0	0
Arenac	0	0	0	0
Baraga	0	0	0	0
Barry	0	0	14	14
Bay	0	7	1	8
Benzie	0	0	0	0
Berrien	63	25	46	134
Branch	0	4	5	9
Calhoun	0	84	21	105
Cass	0	10	4	14
Charlevoix	0	0	0	0
Cheboygan	0	4	0	4
Chippewa	9	11	0	20
Clare	0	0	1	1
Clinton	0	5	4	9
Crawford	0	7	1	8
Delta	0	0	2	2
Dickinson	0	0	0	0
Eaton	12	13	13	38
Emmet	0	0	0	0
Genesee	33	18	13	64
Gladwin	0	2	8	10
Gogebic	0	0	0	0
Grand Traverse	0	0	1	1
Gratiot	0	4	6	10
Hillsdale	0	0	0	0
Houghton	0	0	0	0
Huron	0	4	0	4
Ingham	0	0	1	1
Ionia	0	2	0	2
Iosco	0	0	4	4
Iron	0	0	0	0
Isabella	0	0	0	0
Jackson	0	1	5	6
Kalamazoo	11	20	16	47
Kalkaska	0	0	2	2
Kent	80	30	33	143
Keweenaw	0	0	0	0
Lake	0	0	6	6
Lapeer	0	7	15	22
Leelanau	0	2	1	3
Lenawee	0	0	13	13
Livingston	0	11	20	31
Luce	3	0	2	5
Mackinac	7	0	1	8
Macomb	0	12	31	43
Manistee	0	2	3	5

Appendix D *(Continued)*

County Name	Number of Cases Reviewed 1995-1997	Number of Cases Reviewed 1998	Number of Cases Reviewed 1999	Total Number of Cases Reviewed 1995-1999
Marquette	0	0	3	3
Mason	3	0	6	9
Mecosta	0	18	8	26
Menominee	0	0	3	3
Midland	0	0	0	0
Missaukee	0	1	1	2
Monroe	0	0	0	0
Montcalm	0	13	20	33
Montmorency	0	0	0	0
Muskegon	0	25	16	41
Newaygo	0	6	13	19
Oakland	14	0	22	36
Oceana	0	0	13	13
Ogemaw	0	0	0	0
Ontonagon	0	0	0	0
Osceola	0	0	7	7
Oscoda	0	0	0	0
Otsego	0	2	1	3
Ottawa	0	19	29	48
Presque Isle	0	0	1	1
Roscommon	0	0	5	5
Saginaw	0	3	11	14
St. Clair	57	23	39	119
St. Joseph	0	8	12	20
Sanilac	1	0	0	1
Schoolcraft	0	0	0	0
Shiawassee	0	13	12	25
Tuscola	10	0	3	13
Van Buren	0	12	12	24
Washtenaw	1	20	4	25
Wayne	42	25	43	110
Wexford	0	1	5	6
Total	**346**	**481**	**602**	**1429**

Appendix E

Total Number of Deaths Among Michigan Residents 0-18 Years of Age by County of Residence and Year of Death, 1989-1998

County of Residence	Year of Death										
	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1989-1998
Alcona	4	1	1	-	2	2	1	-	2	-	13
Alger	-	1	-	3	1	1	1	2	2	2	13
Allegan	25	20	13	17	20	21	19	23	16	29	203
Alpena	6	4	9	2	12	2	3	7	4	5	54
Antrim	4	2	3	5	3	5	4	6	7	-	39
Arenac	4	3	4	4	4	3	2	2	1	5	32
Baraga	1	2	1	1	-	2	2	1	3	1	14
Barry	10	18	12	8	13	10	9	6	15	14	115
Bay	21	25	30	37	28	15	23	21	14	14	228
Benzie	1	6	2	3	1	3	5	2	3	-	26
Berrien	50	62	50	43	41	43	48	40	46	32	455
Branch	11	17	10	12	13	9	6	9	6	9	102
Calhoun	44	32	36	36	43	26	25	25	47	22	336
Cass	11	9	9	19	16	15	11	9	11	11	121
Charlevoix	5	3	5	3	3	4	7	8	6	6	50
Cheboygan	6	11	7	6	9	5	6	3	6	6	65
Chippewa	4	4	6	6	5	7	9	5	6	4	56
Clare	6	5	4	4	6	8	5	7	6	5	56
Clinton	10	13	11	10	8	7	11	4	11	8	93
Crawford	6	6	4	4	6	3	4	4	1	1	39
Delta	4	6	10	5	7	12	6	3	7	3	63
Dickinson	2	1	9	6	1	4	3	3	3	5	37
Eaton	17	29	16	11	18	17	14	21	5	14	159
Emmet	6	6	6	9	7	2	4	2	6	2	50
Genesee	149	156	144	130	130	148	122	139	138	122	1,378
Gladwin	8	10	4	4	-	4	10	6	4	6	56
Gogebic	2	-	5	1	3	2	3	1	8	3	28
Grand Traverse	14	8	21	17	14	8	8	13	11	12	126
Gratiot	10	4	10	9	11	10	11	9	7	6	87
Hillsdale	13	12	11	11	13	19	9	7	14	8	117
Houghton	5	6	4	6	4	4	6	3	7	5	50
Huron	5	5	12	14	4	7	6	7	4	8	72
Ingham	64	81	63	61	63	63	50	50	42	46	583
Ionia	17	19	29	15	14	11	9	12	13	4	143
Iosco	3	3	5	1	5	8	5	2	1	3	36
Iron	3	3	3	2	1	-	3	-	-	4	19
Isabella	10	12	11	14	9	13	11	8	7	13	108
Jackson	43	44	38	33	32	36	25	30	32	41	354
Kalamazoo	54	47	61	56	50	32	41	40	44	58	483
Kalkaska	6	4	3	5	7	4	2	5	4	3	43
Kent	155	136	143	114	140	136	120	129	98	106	1,277
Keweenaw	-	-	-	-	3	-	-	1	-	-	4
Lake	2	6	3	4	3	5	3	3	4	2	35
Lapeer	20	15	22	16	18	8	9	13	24	19	164
Leelanau	3	2	6	3	6	3	1	3	1	1	29
Lenawee	25	21	15	23	29	17	18	12	18	20	198
Livingston	14	34	22	15	27	13	13	25	15	23	201
Luce	2	3	-	3	-	-	-	2	3	-	13
Mackinac	3	-	-	-	1	1	1	5	3	-	14
Macomb	135	118	120	107	116	102	113	109	103	101	1,124
Manistee	4	2	4	6	3	1	5	5	2	5	37

Appendix E *(Continued)*

County of Residence	Year of Death										
	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1989-1998
Marquette	13	8	11	15	13	14	12	10	12	9	117
Mason	4	5	2	4	15	3	4	6	8	6	57
Mecosta	6	15	18	10	9	12	4	5	6	14	99
Menominee	5	3	6	7	7	6	5	4	2	4	49
Midland	18	13	17	16	13	22	10	15	15	16	155
Missaukee	5	3	6	6	4	1	2	3	3	2	35
Monroe	21	29	27	24	18	26	22	29	2	18	239
Montcalm	15	13	15	12	11	10	13	11	12	18	130
Montmorency	3	-	-	-	-	-	1	1	1	-	6
Muskegon	53	42	60	41	32	43	37	37	39	39	423
Newaygo	16	8	5	9	12	12	9	9	12	8	100
Oakland	223	202	210	217	185	177	180	148	175	168	1,885
Oceana	4	5	9	6	9	4	5	5	4	7	58
Ogemaw	2	7	6	6	4	4	6	7	3	9	54
Ontonagon	1	-	1	4	3	-	1	1	-	1	12
Osceola	8	6	5	7	2	2	2	4	5	9	50
Oscoda	3	4	4	-	2	3	4	1	1	4	26
Otsego	7	4	4	2	2	3	2	6	5	3	38
Ottawa	43	36	38	34	38	38	40	39	31	44	381
Presque Isle	1	4	1	3	2	-	7	-	-	2	20
Roscommon	4	3	5	2	7	2	4	4	4	5	40
Saginaw	75	80	71	74	59	51	48	49	51	47	605
St. Clair	40	40	34	28	34	39	20	32	32	15	314
St. Joseph	19	24	13	17	12	12	18	11	10	13	149
Sanilac	14	9	12	16	5	16	13	7	3	7	102
Schoolcraft	4	1	2	1	1	1	2	3	-	4	19
Shiawassee	21	15	19	10	15	11	11	10	14	13	139
Tuscola	23	11	16	6	21	21	18	17	17	13	163
Van Buren	24	25	28	17	20	15	19	15	17	25	205
Washtenaw	63	53	53	56	43	43	50	34	39	36	470
Wayne	955	982	907	905	775	726	655	603	581	570	7,659
Wexford	8	4	7	4	5	7	8	5	4	5	57
Unknown	2	4	2	1	2	4	-	2	1	1	19
Total	**2,727**	**2,695**	**2,631**	**2,484**	**2,353**	**2,209**	**2,064**	**1,985**	**1,973**	**1,952**	**23,073**

Source: Division for Vital Records and Health Statistics, Michigan Department of Community Health, 1999.

Appendix F

Total Number of Deaths Among Michigan Residents 0-18 Years of Age by County of Residence and Age Group, 1998

County of Residence	Age Group					
	<1	1-4	5-9	10-14	15-18	Total
Alcona	-	-	-	-	-	-
Alger	2	-	-	-	-	2
Allegan	15	5	1	2	6	29
Alpena	4	-	-	-	1	5
Antrim	-	-	-	-	-	-
Arenac	2	-	1	2	-	5
Baraga	1	-	-	-	-	1
Barry	6	3	1	3	1	14
Bay	8	2	1	2	1	14
Benzie	-	-	-	-	-	-
Berrien	17	1	4	2	8	32
Branch	3	1	-	-	5	9
Calhoun	11	3	2	4	2	22
Cass	2	2	-	1	6	11
Charlevoix	2	2	-	-	2	6
Cheboygan	2	1	-	1	2	6
Chippewa	2	-	-	2	-	4
Clare	2	-	2	-	1	5
Clinton	3	1	2	-	2	8
Crawford	1	-	-	-	-	1
Delta	1	-	-	1	1	3
Dickinson	4	1	-	-	-	5
Eaton	8	2	-	-	4	14
Emmet	1	-	-	-	1	2
Genesee	75	8	15	6	18	122
Gladwin	3	-	-	1	2	6
Gogebic	3	-	-	-	-	3
Grand Traverse	5	2	1	1	3	12
Gratiot	4	-	-	1	1	6
Hillsdale	4	1	-	2	1	8
Houghton	3	-	1	-	1	5
Huron	2	2	-	3	1	8
Ingham	26	9	1	2	8	46
Ionia	2	-	-	-	2	4
Iosco	2	-	-	-	1	3
Iron	-	-	-	3	1	4
Isabella	5	1	1	3	3	13
Jackson	26	5	1	4	5	41
Kalamazoo	31	5	5	7	10	58
Kalkaska	2	-	-	-	1	3
Kent	63	14	10	4	15	106
Keweenaw	-	-	-	-	-	-
Lake	-	2	-	-	-	2
Lapeer	11	-	1	4	3	19
Leelanau	-	-	-	-	1	1
Lenawee	7	3	2	3	5	20
Livingston	8	3	5	1	6	23
Luce	-	-	-	-	-	-
Mackinac	-	-	-	-	-	-
Macomb	64	10	3	6	18	101
Manistee	1	-	1	1	2	5

Appendix F *(Continued)*

County of Residence	Age Group					
	<1	1-4	5-9	10-14	15-18	Total
Marquette	7	-	-	-	2	9
Mason	3	-	1	-	2	6
Mecosta	9	1	1	-	3	14
Menominee	1	-	-	-	3	4
Midland	6	3	1	2	4	16
Missaukee	1	-	-	-	1	2
Monroe	8	3	-	1	6	18
Montcalm	10	1	1	1	5	18
Montmorency	-	-	-	-	-	-
Muskegon	15	6	4	4	10	39
Newaygo	4	1	-	1	2	8
Oakland	107	12	11	13	25	168
Oceana	7	-	-	-	-	7
Ogemaw	3	1	1	2	2	9
Ontonagon	-	-	-	1	-	1
Osceola	4	1	1	1	2	9
Oscoda	-	1	-	2	1	4
Otsego	1	-	-	1	1	3
Ottawa	24	5	4	4	7	44
Presque Isle	2	-	-	-	-	2
Roscommon	4	-	-	1	-	5
Saginaw	25	3	1	8	10	47
St. Clair	6	1	1	3	4	15
St. Joseph	4	5	3	-	1	13
Sanilac	2	1	2	-	2	7
Schoolcraft	3	-	-	-	1	4
Shiawassee	8	1	1	1	2	13
Tuscola	6	2	-	4	1	13
Van Buren	16	3	-	1	5	25
Washtenaw	17	2	3	4	10	36
Wayne	340	58	50	41	81	570
Wexford	3	1	-	-	1	5
Unknown	1	-	-	-	-	1
Total	**1,091**	**201**	**147**	**168**	**345**	**1,952**

Source: Division for Vital Records and Health Statistics, Michigan Department of Community Health, 1999.

Appendix G

Total Number of Deaths Among Michigan Residents
0-18 Years of Age by Cause, 1989-1998

Cause	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998
Accident*										
Motor vehicle and road-related accident	336	272	288	268	235	283	263	283	261	238
Poisoning	13	5	9	7	6	9	3	5	8	9
Falls	3	5	3	6	2	7	4	9	7	13
Fire	71	49	71	72	72	63	45	28	35	52
Drowning	32	44	45	38	42	33	45	43	35	40
Hanging, strangulation and suffocation	38	25	37	25	43	36	37	36	30	29
Accident caused by farm machines	4	3	4	2	5	-	2	3	1	2
Cutting and piercing instruments	-	-	2	-	-	-	-	-	-	-
Firearm	13	14	14	18	13	13	10	13	9	3
Electrocution	1	2	3	1	1	5	-	2	2	2
Other	19	22	18	15	20	21	18	15	19	17
Suicide*										
Poisoning	13	7	6	9	2	4	2	5	2	4
Hanging, strangulation and suffocation	13	22	12	11	17	13	9	12	28	19
Drowning	-	-	1	-	-	-	1	-	-	-
Firearm	50	44	41	43	44	44	41	31	32	30
Cutting and piercing instruments	-	-	-	-	-	-	-	-	-	-
Falls	-	-	-	-	-	1	-	-	2	1
Fire	-	-	1	-	-	-	-	-	3	-
Motor vehicle crash	-	-	-	1	-	-	-	-	-	-
Other	1	2	-	-	-	2	2	2	3	-
Homicide*										
Poisoning	-	-	1	-	-	1	-	-	-	-
Hanging and strangulation	5	3	9	4	2	4	6	6	2	7
Drowning	7	1	1	-	-	1	2	3	1	2
Firearm	115	122	125	100	118	111	98	75	72	65
Cutting and piercing instruments	9	18	10	9	8	8	11	9	9	2
Child battering and other maltreatment	11	22	15	19	17	13	16	13	11	14
Fire	4	10	3	9	4	2	10	7	1	18
Fall (pushing from a high place)	-	-	-	-	-	-	-	-	-	-
Neglect and abandonment	1	-	2	1	-	1	-	-	2	-
Other	7	6	9	4	15	16	16	9	15	17
Undetermined*										
Poisoning	1	4	2	3	1	2	2	2	1	2
Hanging, strangulation and suffocation	1	3	2	2	1	-	-	2	1	2
Drowning	1	1	-	-	2	-	-	-	-	-
Firearm	-	5	2	4	4	7	6	5	1	1
Fall	-	-	-	-	-	-	-	-	-	1
Fire	-	2	-	-	-	-	-	2	4	5
Motor vehicle crash	1	-	-	-	-	-	-	-	-	-
Other	2	1	3	1	2	1	2	1	1	1
Natural										
Perinatal Conditions	899	832	819	791	664	599	551	536	583	532
Congenital Anomalies	333	362	324	302	275	270	266	246	255	254
SIDS	256	258	240	244	210	167	148	149	138	148
Cancer	88	97	116	99	85	100	73	71	76	64
Infectious/Parasitic Diseases	46	65	55	47	45	47	45	46	28	48
All Other Medical Conditions	333	367	338	329	398	325	330	316	295	310
Total	**2,727**	**2,695**	**2,631**	**2,484**	**2,353**	**2,209**	**2,064**	**1,985**	**1,973**	**1,952**

* Includes ICD codes: E800-E989.

Source: Division for Vital Records and Health Statistics, Michigan Department of Community Health, 1999.
1989-1998 Death Files.

Appendix H

Estimated Population of Michigan Children 0-18 Years of Age by County of Residence and Age Group, 1998

County of Residence	Age Group					
	<1	1-4	5-9	10-14	15-18	Total
Alcona	103	407	626	674	549	2,359
Alger	103	413	642	696	535	2,389
Allegan	1,471	6,256	8,668	8,385	6,004	30,784
Alpena	356	1,438	2,222	2,330	1,814	8,160
Antrim	250	1,105	1,497	1,549	1,197	5,598
Arenac	193	778	1,160	1,259	928	4,318
Baraga	90	399	535	618	460	2,102
Barry	695	2,962	4,185	4,378	3,203	15,423
Bay	1,401	5,704	7,703	8,311	6,372	29,491
Benzie	172	737	978	967	717	3,571
Berrien	2,169	8,725	12,437	12,007	9,139	44,477
Branch	572	2,446	3,470	3,236	2,442	12,166
Calhoun	1,952	7,575	10,534	10,337	8,215	38,613
Cass	609	2,598	3,736	3,850	2,905	13,698
Charlevoix	341	1,339	1,864	1,794	1,297	6,635
Cheboygan	290	1,176	1,734	1,754	1,319	6,273
Chippewa	418	1,689	2,545	2,456	1,995	9,103
Clare	417	1,586	2,119	2,160	1,570	7,852
Clinton	818	3,496	4,974	5,289	3,931	18,508
Crawford	178	762	1,097	992	738	3,767
Delta	426	1,911	2,827	3,140	2,378	10,682
Dickinson	321	1,343	2,006	1,966	1,405	7,041
Eaton	1,211	5,301	7,738	8,064	6,170	28,484
Emmet	375	1,603	2,139	2,094	1,542	7,753
Genesee	6,206	24,816	34,996	33,801	25,999	125,818
Gladwin	313	1,319	1,784	1,904	1,448	6,768
Gogebic	166	691	1,050	1,053	916	3,876
Grand Traverse	948	4,185	5,804	5,570	4,057	20,564
Gratiot	504	2,002	2,929	3,176	2,520	11,131
Hillsdale	624	2,631	3,558	3,773	2,929	13,515
Houghton	366	1,592	2,185	2,279	2,359	8,781
Huron	443	1,790	2,657	2,704	1,999	9,593
Ingham	3,907	15,761	20,312	18,381	17,528	75,889
Ionia	819	3,505	4,888	4,840	3,988	18,040
Iosco	296	1,192	1,759	1,701	1,255	6,203
Iron	116	486	777	831	597	2,807
Isabella	720	2,831	3,813	3,807	4,447	15,618
Jackson	2,056	8,374	11,153	11,157	8,536	41,276
Kalamazoo	3,032	12,468	16,136	14,804	13,308	59,748
Kalkaska	223	874	1,272	1,364	908	4,641
Kent	8,880	35,123	45,366	40,086	29,147	158,602
Keweenaw	17	75	102	130	92	416
Lake	104	527	754	755	499	2,639
Lapeer	1,118	4,739	7,246	7,687	5,886	26,676
Leelanau	254	1,046	1,410	1,323	948	4,981
Lenawee	1,314	5,167	7,373	7,823	6,529	28,206
Livingston	1,857	8,115	11,258	11,766	9,430	42,426
Luce	75	281	407	479	368	1,610
Mackinac	120	571	721	810	611	2,833
Macomb	9,766	39,123	50,952	51,338	41,749	192,928
Manistee	236	1,014	1,479	1,554	1,220	5,503

Appendix H *(Continued)*

County of Residence	Age Group					
	<1	1-4	5-9	10-14	15-18	Total
Marquette	675	2,891	4,334	4,583	3,827	16,310
Mason	332	1,440	1,995	2,096	1.525	7,388
Mecosta	470	1,939	2,526	2,634	2,930	10,499
Menominee	276	1,141	1,810	1,940	1,335	6,502
Midland	1,096	4,509	6,138	6,293	4,935	22,971
Missaukee	178	802	1,246	1,159	762	4,147
Monroe	1,981	8,054	11,089	11,762	9,151	42,037
Montcalm	861	3,398	4,757	4,794	3,748	17,558
Montmorency	110	419	648	706	508	2,391
Muskegon	2,392	9,941	13,598	12,652	9,188	47,771
Newaygo	681	2,787	3,808	3,756	2,592	13,624
Oakland	15,722	61,516	79,896	77,746	60,697	295,577
Oceana	344	1,440	2,033	2,105	1,501	7,423
Ogemaw	293	1,022	1,546	1,617	1,204	5,682
Ontonagon	81	348	450	540	446	1,865
Osceola	282	1,235	1,825	1,862	1,443	6,647
Oscoda	120	438	627	572	392	2,149
Otsego	283	1,264	1,828	1,786	1,234	6,395
Ottawa	3,342	14,221	18,848	17,887	13,908	68,206
Presque Isle	155	650	1,036	1,096	784	3,721
Roscommon	241	940	1,386	1,408	1,028	5,003
Saginaw	2,938	11,812	16,390	16,305	12,975	60,420
St. Clair	2,142	8,888	12,214	12,349	9,691	45,284
St. Joseph	883	3,543	4,931	4,942	3,684	17,983
Sanilac	551	2,355	3,290	3,554	2,561	12,311
Schoolcraft	83	381	613	633	493	2,203
Shiawassee	913	3,885	5,507	6,100	4,806	21,211
Tuscola	708	3,075	4,455	4,894	3,861	16,993
Van Buren	1,028	4,328	6,294	6,263	4,516	22,429
Washtenaw	4,031	15,159	18,934	16,979	16,651	71,754
Wayne	31,469	125,518	166,352	148,963	115,990	588,292
Wexford	409	1,686	2,433	2,287	1,645	8,460
Michigan*	**134,483**	**543,071**	**732,415**	**705,470**	**556,097**	**2,671,536**

* Numbers do not add up due to rounding.
Source: Estimated Population by County, Age, Race and Sex, 1998. Michigan Department of Management and Budget.

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